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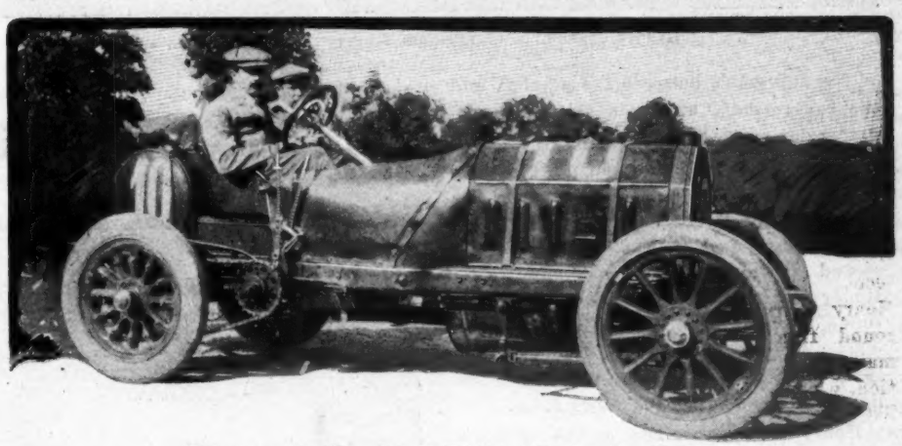
# MOTOR AGE

## ITALY AND FRANCE IN GREAT ROAD BATTLE

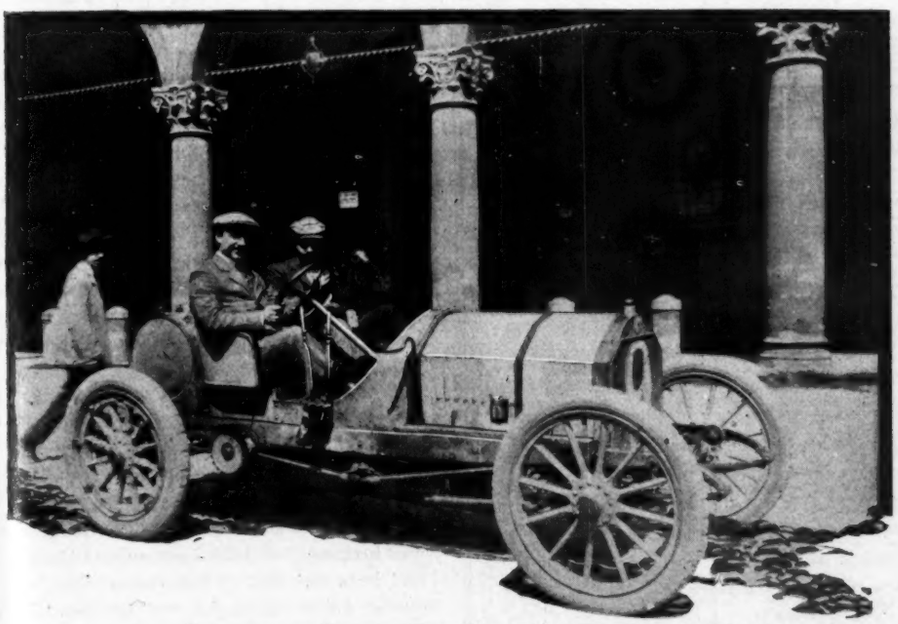
BOLOGNA, ITALY, Sept. 8—Two days of road racing in which Italy and France were the contenders resulted in an even break so far as victories are concerned, but Italy got a little better of the argument because the Florio cup is of greater importance than the Targa Bologna, which was France's share of the plunder. The Florio was run Sunday and to win it Nazzaro in a Fiat had to crack his own world's record of 70.61 by averaging 74.3 miles an hour for 328.2 miles. The Targa Bologna, which was taken by Porporato in a Berliet, was a remarkable exhibition, for the Berliet—nothing more than a touring car stripped and with an engine with the smallest bore of any in the race—averaged 65.3 miles an hour for 262 miles.



NAZZARO IN A FIAT AFTER WINNING FLORIO CUP RACE

Not only was the Florio the fastest ever run, but it was one of the most interesting and keenly disputed Europe has known. There were seventeen starters, representing two Italian and four French firms, all using the special 155-millimeter bore cars built for and run in the grand prix at Dieppe this summer.

Less than ½ hour after the start Duray had roared by again in his de Dietrich, the time which was hoisted up on the board a minute later being 24:55⅕, which for the 32-mile course works out at the merest fraction under 80 miles an hour. Lancia got ahead of both Gauderman and Demogeot on the first round, scoring 24:16, or just over 80 miles an hour. Gabriel maintained his position behind the Fiat, and had just roared by when Gauderman's failure to appear in position was explained by his arrival with the left front tire and rim missing. He stated that the rim, which was a new Vinet with some modification which had not been previously tested, had flown off on the straightaway. He was able to hold the car to the road, but had to retire immediately, for the fixed rim was flattened beyond repair.



PORPORATO IN BERLIET, WHO WON TARGA BOLOGNA FOR FRANCE

It was probably owing to the fear of rim failure that numerous changes had been made since the Dieppe race. The Michelin people had slightly modified their rim by the addition of a raised section opposite the valve, and a special pin to prevent the single locking turnbuckle getting out of vertical. It proved successful, not a single accident or mishap occurring. The Dunlop rim found a place on the rear wheels of several of the cars, but no driver would accept it for the front, the opinion being that it was too heavy, and that its powerful lock threw the wheel out of balance sufficiently to interfere with the steadiness of the car at highest speeds.

Minoia furnished the highest rate of speed on the initial circuit, his de Dietrich getting round in 24:15⅘—over 80 miles an hour. Hautvast failed to make the initial round with No. 11 Bayard-Clement. His own explanation was that the steel-studded tires refused to hold when he applied the brakes to make one of the right-angle turns. He skidded as if he were on soap, had to choose between the spectators and the ditch and went into the latter, his car broken, but without a scratch to himself or mechanic. Faroux was unable to finish the initial round, one

LANCIA MAKING A CHANGE OF FRONT TIRE IN CONTROL

of the universals between the gearbox and the countershaft having developed weaknesses during the first 10 miles.

Lancia jumped into second position during the second round, getting over the course in the record time of 23:24, or at the killing pace of 84.3. Wagner got second position, followed at 3 minutes by Henry Fournier, who had jumped in one round from ninth place. Nazzaro was maintaining a steady pace in fourth position, while Shepard was at the end of the list with Landon, of the Mors team.

Henry Fournier made a fine struggle with Lancia during the third and fourth rounds. On passing the grand stand at the end of the second round the Italian had a lead on the Frenchman of a fraction over 3 minutes. By the end of the second round Lancia and his Fiat had increased the distance from the Itala by exactly 1 minute. Fournier, however, was hard after him, and by some of the most dashing driving ever seen got past the Fiat and won first place. His triumph, however, did not last long enough to be officially recorded, for on arriving at the last bend before the grand stand straightaway he went into the ditch but a yard from Hautvast's Bayard-Clement. Fournier was slightly cut about the mouth and had bruises on various parts of the body; his mechanic, however, escaped from the accident with comparatively little injury.

Duray in the de Dietrich and Piacenza in the Itala had both failed to appear after the first round. The fate of the latter was not known until the end of the meet, when he drove in and explained that a disarrangement of the timing gears had obliged him to dismount the lower half of the crankcase. The mystery about Duray was explained, just when Nazzaro had worked into first position, by the slow arrival of Wagner's Fiat with Duray and mechanic hanging on behind. In the white jersey decorated with the Lorraine cross Duray had a portion of an exhaust valve which told the story of his undoing. One of the exhaust valves had broken, dropped into the cylinder and quickly done damage that was beyond a roadside repair. Wagner was also entirely out of the running, with a front axle that had broken exactly through the middle. It was an unusual mishap, that might have been due to crystallization or to an unusually severe shock when passing over a lump on the road, the car going up and dropping down on one wheel. The axle really looked as if it had been cut through with a hack saw. Wagner made a temporary repair of this break with a log of wood and a few lengths of rope which was cleverly done. At the end of the fifth round, while leading Trucco by less than 2 minutes, Nazzaro pulled in at the grand stand, jacked up the rear of his car and changed both tires. This was the only work he did at the tire station, one other tire being changed on the road; the front tires went the whole distance. Smooth Michelins in conjunction with the new and modified rim were employed by Nazarro throughout this road race.

JACKS USED IN MAKING QUICK TIRE CHANGES

The struggle was now between Nazzaro, Trucco, Lancia and Garcet, all of them so well grouped that although Nazzaro was leading the final issue was doubtful. During the sixth round Lancia's ill-luck attacked him in the form of the breakage of an overhead rocker arm, the replacement of which at the central tire station occupied about 20 minutes and removed all possibility of first place.

During the sixth round of the leaders it was learned that both Landon and Shepard had been put out of the game. The Mors driver failed to make one of the turns, shot off the road and landed in the canal

## RESULTS OF THE FLORIO CUP, DISTANCE 328.2 MILES

| Car and Driver | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Miles per hr. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiat, Nazzaro | 25:36 | 51:14 | 1:17:31 | 1:42:42 | 2:10:12 | 2:37:21 | 3:03:56 | 3:33:07 | 3:59:03 | 4:25:21 | 74.3 |
| | | 25:38 | 26:17 | 25:12 | 27:50 | 27:09 | 26:34 | 29:12 | 25:56 | 27:18 | |
| Dietrich, Trucco | 26:13 | 53:46 | 1:19:34 | 1:45:24 | 2:12:15 | 2:43:00 | 3:09:03 | 3:35:20 | 4: 7:19 | 4:34:07 | 71.8 |
| | | 27:13 | 25:48 | 25:50 | 32:51 | 24:47 | 26:03 | 26:17 | 31:59 | 26:48 | |
| Itala, Cagno | 25:49 | 55:25 | 1:21:48 | 1:50:36 | 2:19:41 | 2:50:41 | 3:16:37 | 3:43:20 | 4:17:16 | 4:56:12 | 66.4 |
| | | 29:24 | 26:23 | 28:50 | 29:05 | 31:00 | 25:56 | 26:43 | 33:55 | 38:57 | |
| Mors, Demogeot | 28:49 | 57:07 | 1:25:05 | 1:56:57 | 2:25:16 | 2:56:11 | 3:28:26 | 3:57:44 | 4:24:56 | 4:57:11 | 66.2 |
| | | 28:18 | 28:08 | 31:42 | 28:19 | 30:55 | 32:15 | 29:18 | 27:12 | 32:15 | |
| Fiat, Lancia | 24:16 | 48:10 | 1:22:33 | 1:41:10 | 2:15:30 | 3:12:58 | 3:42:37 | 4:10:17 | 4:41:10 | 5: 8:51 | 63.7 |
| | | 23:24 | 24:23 | 28:37 | 34:40 | 57:28 | 29:41 | 27:38 | 30:53 | 27:41 | |
| Mors, Garet | 26:10 | 51:51 | 1:17:47 | 1:48:43 | 2:16:42 | 2:49:51 | 3:40:53 | 4:18:21 | 4:48:01 | 5:22:07 | 61.1 |
| | | 25:39 | 25:56 | 30:56 | 27:59 | 33:09 | 51:02 | 37:28 | 29040 | 14:06 | |
| Dietrich, Minoia | 24:15 | 1 :8:40 | 1:34:45 | 1:59:26 | 2:24:48 | 2:57:12 | 3:21:30 | 3,47:30 | 4:15:45 | Broke | front |
| | | 26:59 | 43:31 | 24:41 | 24:42 | 33:04 | 24:18 | 26:00 | 28:15 | wheel | bear. |
| Bayard-Clement, Gabriel | 24:40 | 58:15 | 1:25:59 | 1:54:25 | 2:27:35 | 2:53:20 | 3:23:42 | 4:30:32 | Broke | exhau | st val |
| | | 33:35 | 27:35 | 28:32 | 32:42 | 26:15 | 30:22 | 1:06:50 | | | |
| Mors, Landon | 35:10 | 1:05:03 | 1:30:27 | 2:06:33 | 2:33:07 | Misse | d turn | ; went | into c | anal | |
| | | 29:53 | 25:24 | 35:06 | 27:34 | | | | | | |
| Itala, Fournier | 25:42 | 51:05 | 1:16:03 | Miss | ed tur | n; we | nt into | ditch | | | |
| | | 25:27 | 24:58 | | | | | | | | |
| Fiat, Wagner | 24:17 | 48:47 | 1:17:35 | Broke | front | axle | | | | | |
| | | 24:30 | 28:46 | | | | | | | | |
| Bayard-Clement, Shepard | 25:24 | 1:07:24 | 1:40:38 | 2:10:41 | Bent | rear | axle | housin | g | | |
| | | 47:10 | 33:04 | 30:03 | | | | | | | |
| Dietrich, Duray | 24:55 | Broke | over h | ead ex | haust | valve | | | | | |
| Itala, Piacenza | 25:26 | Broke | timing | gears | | | | | | | |
| Motobloc, Gauderman | 28:15 | Lost | dismo | untabl | e rim | on str | aight a | way | | | |
| Bayard-Clement, Hautvast | Mis | sed tu | rn; we | nt int | o ditch | | | | | | |
| Motobloc, Faroux | Bro | ke uni | versal | joint o | n card | an sha | ft | | | | |

containing 12 feet of water. Fortunately the men were not pinned underneath and a few minutes later were on the road again. Considering the fall, it was surprising how little damage had been done: one driving chain had been torn off, the hollow countershaft had snapped in two and the exhaust piping had been carried away. Every other part was intact. Shepard explained his accident when he drove into the paddock at the end of the fifth round. The left rear tire burst and locked the wheel with such violence that the rear axle casing made a half circle, the truss rod being broken off and brake connections snapped. Most of the bolts having been sheared one-half, the axle casing began to come away from the differential housing.

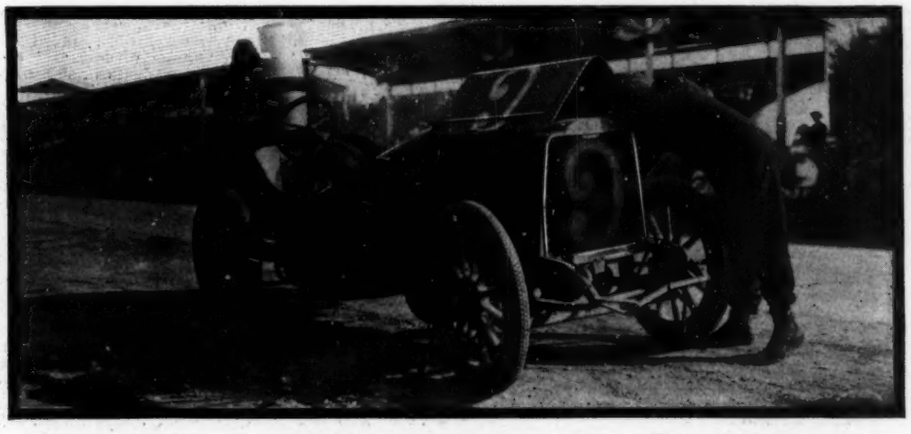
From seventeen the number of competitors had been diminished to eight: Nazzaro, Trucco, Cagno, Minoia, Gabriel, Demogeot, Garcet and Lancia. Trucco was running almost neck and neck with Nazzaro; Garcet might have been really dangerous had not a leak sprung up in his radiator system, obliging him to carry a jug of water with him; it was not Gabriel's lot to finish, the overhead exhaust valve of the second cylinder breaking off and falling in, just as had happened to Duray's de Dietrich. There were now seven struggling for victory, the two de Dietrichs and the one Itala being so dangerous that they all beat Nazzaro on the eighth round. Lancia, too, was coming to the attack again, after his long delay, and seemed capable of gaining one or two places.

When the red No. 10 roared by on the last round, with victory certain for Nazzaro barring accidents, the cannon boomed and the grand stand got ready for a rousing reception. They were not disappointed, for 27 minutes later with a margin of 9 minutes in his favor Nazzaro was the winner of the Florio cup, disputed for the third time.

In the Targa Bologna Porporato, the Italian driver of the winning Berliet, covered the 262.5 miles in 4:00:56, which is equal to 65.3 miles an hour—very satisfactory going for a four-cylinder car of but 120 millimeters—4.7 inch—bore. True to its fixed policy, the Lyons factory refused to enter a car in the Italian race, but gave permission to Porporato, one of its chief testers, to make any changes he liked on the standard model and race it on his **own responsibility.** Under the rules, 130 millimeters is allowed all four-cylinder cars; the Berliet model measures 10 millimeters short of this, and it was with this handicap that Porporato set out to prepare for the race. He and his mechanic worked single-handed, the firm being so little interested in the race that not a single official from the factory was present to cheer the winner.

The story of how the race was won is easily told. There were sixteen starters, thirteen of them being Italian and three French. Franchini, on a Bianchi, set the pace with an initial round covered at the rate of 73 miles an hour. Porporato was content with fifth position. The first round saw the Fiat and a Junior go out of business; then failures came so thick and fast that by the end of four rounds nine cars had disappeared through mechanical defects or road accidents, among the breakdowns being Vincenzo Florio's Darracq and the French de Dietrich. During this time Porporato and his Berliet had been reeling off rounds in 28, 29 and 30 minutes, working up to first position during the fourth round. During the fifth he stopped to replace a smooth Dunlop tire by a non-skid, and to add a pint of water to the radiator, done without a stoppage of the engine. Later a rear tire ended its life with a loud report, the strain of a curve at 50 miles an hour having been too much for it. These were the only two occasions on which Porporato left his seat; from beginning to end the bonnet was never raised. Taking advantage of the rule which allowed the changing of wheels during the race, Porporato carried two spare front wheels, with inflated tires in position, on his rear brackets. They remained there, however, until the end of the race, for no tire trouble developed in front. Porporato declared that his reason for taking complete wheels in preference to rims was that the former could be changed quicker than the latter. The car being chain-driven it was impossible, on account of weight, to act in the same way with the rear wheels.

NAZZARO'S FIAT MAKES SHORT STOP TO TAKE ON SUPPLIES



SHOWING RAPID MANNER IN WHICH GASOLINE TANKS WERE FILLED

**RESULTS OF THE TARGA BOLOGNA, DISTANCE 262:58 MILES**

| Car and Driver | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Miles per hr |
|---|---|---|---|---|---|---|---|---|---|
| Berliet, Porporato | 29:38 | 58:37 | 1:31:18 | 2:04:02 | 2:33:15 | 3:02:19 | 3:31:40 | 4:00:56 | 65.3 |
| S. P. A., Appendino | 51:43 | 1:18:46 | 1:47:42 | 2:15:07 | 2:43:15 | 3:12:48 | 3:43:38 | 4:14:05 | 62 |
| Franco, Buzio | 29:05 | 59:27 | 1:33:56 | 2:06:28 | 3:06:15 | 3:38:32 | 4:11:04 | 4:40:57 | 56 |
| Junior, Tangazzi | 39:06 | 1:19:36 | 1:56:16 | 2:27:57 | 2:58:53 | 3:31:43 | 4:09:38 | 4:43:49 | 55.5 |
| Zust, Maggioni | 28:58 | 57:38 | 2:30:24 | 2:59:33 | 3:27:59 | 4:12:36 | 4:40:14 | 5:07:57 | 51.1 |
| S. P. A. Piccoli | 29:09 | 1:02:18 | 1:31:28 | 2:53:23 | 3:34:00 | 4:09:44 | 4:42:59 | 5:15:41 | 47.7 |
| Junior, Manganotti | 1:7:50 | 1:49:40 | 2:34:38 | 3:20:40 | 3:57:40 | 4:46:50 | | | |
| Bianchi, Brambilla | 29:51 | 59:28 | 1:27:36 | 2:33:51 | | | | | |
| Franco, Cariolato | 37:33 | 1:10:56 | 1:48:47 | | | | | | |
| Bianchi, Mayr-Franchini | 27:06 | 54:40 | | | | | | | |
| Bianchi, Tommaselli | 31:15 | | | | | | | | |
| Darracq, Ravetto | 32:18 | | | | | | | | |
| Dietrich, Parran | 46:13 | | | | | | | | |
| Diatto-Clement, Primavesi | 48:58 | | | | | | | | |
| Fiat, Vaccari | | | | | | | | | |
| Junior, Tamagni | | | | | | | | | |

# "RACING WAR" TERMINATED BY AGREEMENT

NEW YORK, Sept. 21—A stop has been put by the parties themselves to the so-called "racing war" between the American Automobile Association and the Automobile Club of America. The conference committees, which were in executive session for a fortnight, with the chief idea of making an adjustment of differences between the two bodies over the running of the Vanderbilt cup race on Long Island and the grand prize contest at Savannah, concluded their negotiations last week and received the approval of their respective principals to the compromise agreed upon. Following the indorsement and signing of the document, the following official statement was issued simultaneously to the public by both parties on Thursday:

Conference committees representing the American Automobile Association and the Automobile Club of America have finally reached a settlement of their differences, which was ratified by the board of governors of the club a few days ago and by the executive committee of the association to-day.

It is agreed that the Automobile Club of America is the only American member of the International Association of Recognized Automobile Clubs, and that it is and shall be the only authority in America for the drafting of rules affecting international races and for the granting of sanctions for international races in this country. On the other hand, the matter of the sanction of and the formulation of rules for local and national races is agreed to be, as heretofore, in the sole power and jurisdiction of the association.

The two bodies agree to coöperate with each other in making the Vanderbilt cup race and the Savannah grand prize race successes. After the races of this year the two cups are to be deeded to an independent racing association and are to be contested for annually, the grand prize cup as the international trophy and the Vanderbilt cup as the national trophy. It is also agreed that the club shall not encourage other clubs to withdraw from the American Automobile Association.

The full text of the agreement was made public by the club on Tuesday. It disclosed other concessions and pledges not embraced in the official statement at first issued. They embrace a definition of "national" and "international" racing in this country. Other points are:

An agreement on the part of both bodies is to hand over next year the Vanderbilt cup and grand prize to a corporation controlled by the Long Island Motor Parkway, Inc., on condition that it promote "national" and "international" races respectively for the two trophies.

The appointment of the Automobile Club of America as the sole representative of the American Automobile Association in foreign racing.

An agreement on the part of the Automobile Club of America to retire from the promotion of motor car racing after the running of the grand prize at Savannah.

A provision that the present "peace agreement" may be terminated upon the first day of January in any year after January 1, 1910, upon 12 months' previous notice in writing.

The text of the agreement as given out by the club follows:

This agreement, made this 11th day of September, 1908, by and between the Automobile Club of America, a membership corporation created under the laws of New York, and the American Automobile Association, a corporation created under the laws of New Jersey, witnesseth:

First—That the American Automobile Association recognizes and acknowledges the Automobile Club of America to be the sole American representative and member of the International Association of Recognized Automobile Clubs, and that as such it is and shall be acknowledged and recognized as the sole and unqualified authority for all international motor car affairs, including races and contests, in the United States of America.

An international race or contest is one which is announced or advertised as "international," or one which is open to entrants of America and foreign countries. Cars of foreign manufacture may be entered in a race or contest without making the same an "international" race or contest, provided, however, that such cars be owned and entered by American citizens, firms or corporations.

Second—The Automobile Club of America agrees that after it has conducted the grand prize race at Savannah, in November, 1908, it will retire from the promotion of races so long as international racing shall be conducted in the United States of America under the sanction of said club and in accordance with the rules of the International Association of Recognized Automobile Clubs in so far as such rules shall apply to the race in question.

Third—The American Automobile Association agrees to have changed the conditions of the Vanderbilt cup race, proposed to be held on Long Island in the fall of 1908, so that the same shall be a purely national race and not international in character, and in that event the Automobile Club of America agrees to remove all embargoes and disqualifications on such Vanderbilt cup race, and the same shall be raced under the rules and conditions as now announced, except such conditions as would make it an international race, and the Automobile Club of America agrees to do everything in its power under these conditions to make such race a success.

Fourth—The American Automobile Association agrees that it will do everything in its power to make the grand prize race at Savannah, proposed to be held in November, 1908, a success and to remove all embargoes and disqualifications against said race and to use its influence in having as many American cars as possible to enter this international race.

Fifth—That after the year 1908 the Automobile Club of America agrees to transfer, under a proper deed of gift, its gold grand prize cup to a corporation controlled by the Long Island Motor Parkway, Incorporated, upon the condition that the said donor each year promote and conduct an international race for the same, under the sanction of the Automobile Club of America and under the rules then existing of the International Association of Recognized Automobile Clubs.

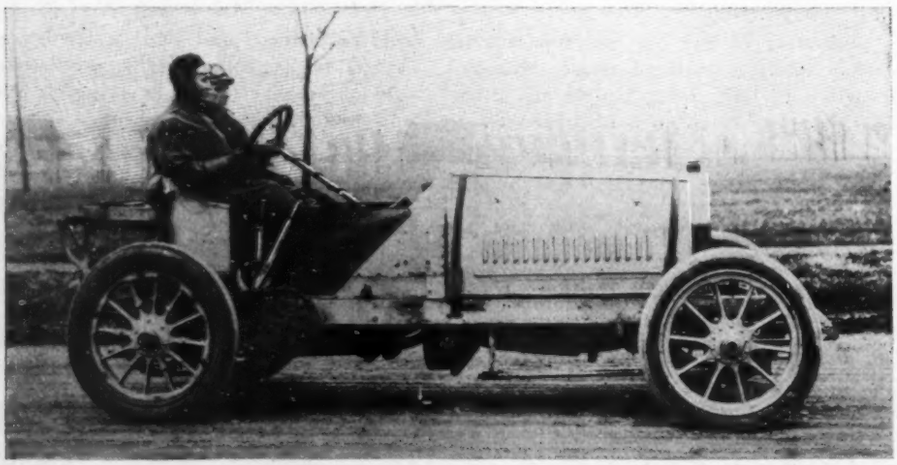
Sixth—The American Automobile Association agrees that after the year 1908 it will have transferred to a corporation controlled by the Long Island Motor Parkway, Incorporated, the Vanderbilt cup, upon the condition that the said donee will promote each year a national race for the said cup, under the sanction and rules of the American Automobile Association for national races.

Seventh—The Automobile Club of America agrees to make no attempts to encourage other clubs to withdraw from the American Automobile Association.

Eighth—It is hereby mutually agreed that the Automobile Club of America shall be the sole representative for the American Automobile Association for all foreign countries.

Ninth—This agreement shall be binding on both parties hereto until terminated, as hereinafter provided. It may be terminated upon the first day of January in any year

ONE OF STRETCHES OF CEMENT ROAD BED OF LONG ISLAND PARKWAY



THOMAS RACER THAT WILL PARTICIPATE IN THE VANDERBILT

after January 1, 1910, upon 12 months' previous notice in writing.

In witness whereof, the high contracting parties have caused these presents to be signed by their duly authorized officers, the date first above written.

For the Automobile Club of America (signed), HENRY SANDERSON, First Vice-President.
S. M. BUTLER, Secretary.

For the American Automobile Association (signed), ROBERT P. HOOPER.
FREDERICK H. ELLIOTT, Secretary.

The status of foreign cars in the Vanderbilt cup race under the above agreement is explained by Jefferson de Mont Thompson, chairman of the cup commission, as follows:

In view of the fact that the race for the selection of the American team has been canceled and under the deed of gift a team of ten cars could compete in this race, the commission desires to call the attention of American citizens owning foreign-made cars and American agents, whether firms or corporations, representing foreign made cars, to the fact that cars of foreign makes, irrespective of selling price, cylinder capacity or other restrictions, save weight, are now eligible for competition in the Vanderbilt cup race.

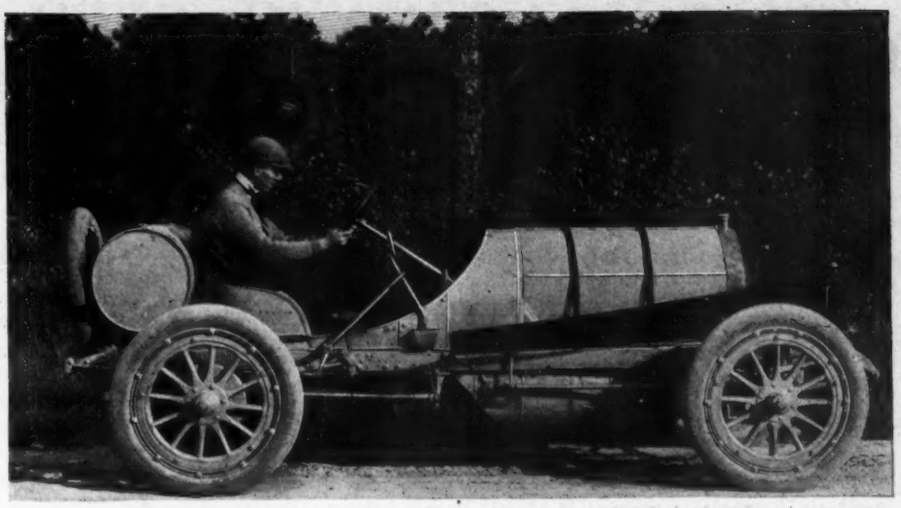
Arrangements providing for a change in the character of the competition for this cup contemplate a change in the deed of gift, and the deed of gift has been changed by the donor, William K. Vanderbilt, Jr., at the request of the association.

The conditions provide simply for a classification by weight with a maximum limit of 2,644.8 pounds. The commission has also extended the date of entry without penalization to October 1, and the entry fee of $1,000 will entitle a manufacturer to enter one, two or three cars.

**Details of Cup Cars**

New York, Sept. 21—With the Vanderbilt itself only a month away those American makers who intend participating in the classic are busily engaged in tuning up their cars and looking after the hundred and one details incidental to a road race of this magnitude. Constructional features of the cars are being discussed and last week two of the entrants—the Knox and Thomas—gave out the specifications of the cars they intend sending to the front. The two Knox candidates already have shown they are exceedingly fast for such low-powered cars, it being a matter of record that the smaller of the two, the model O, has shown 80 miles an hour in the kilometer dash at Wildwood, N. J., during the summer, while the model M has beaten even this in private trials. Both these cars are low-powered, from a Vanderbilt standpoint—the O being 38 and the M 48, but owing to the motor construction both are exceedingly fast. M is a duplicate in design of the O except that its motor is a unit by itself while the transmission, also a unit, is at the rear. The M is chain-drive, whereas the O is shaft. In the O the motor and transmission are together, the power plant being a three-point suspension affair. It is expected that the new three-disk clutch, operating in oil, which is a feature of the 1909 Knox, will be used, although this is not stated in the specifications of the cars. The M has a 48-horsepower four-cylinder motor with 5¾-inch bore and 5½-inch stroke, while the wheels will be 36 by 4½ by 5—larger than on the O which has 34 by 4-inch wheels. Both will use demountable rims. The M has a Mercedes selective transmission, giving four speeds forward and a reverse, while the O has three and one.

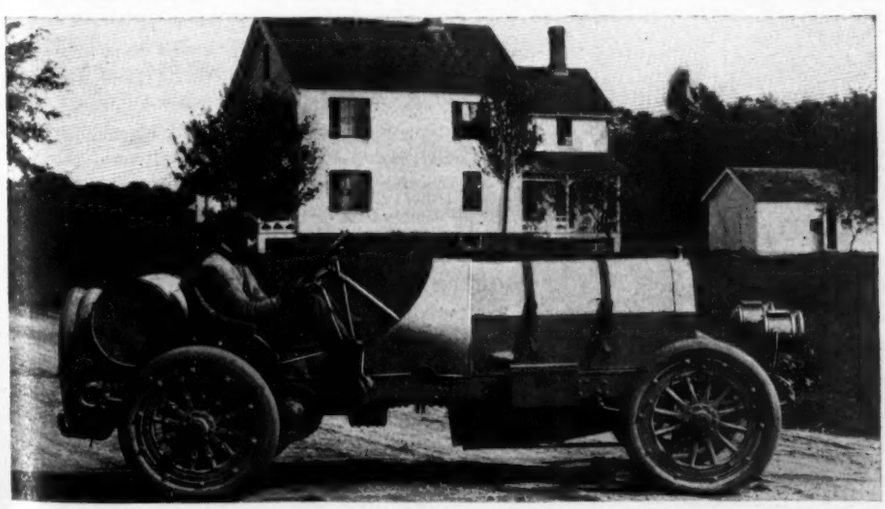
Specifications of the O show that it has a 38-horsepower four-cylinder motor, using the de Dion oiling system and a gear pump water circulation, aided by a fan. The bore and stroke figures show 4⅞ and 4¾ inches respectively, while the wheel base is 102 inches. The weight is 2,100 pounds and the tread is 56 inches. The engine is of the valve-in-the-head type, with the heads removable. Double ignition—high-tension magneto and storage battery—is used, while the car is shaft-drive.



BOURQUE AT WHEEL OF KNOX MODEL O, VANDERBILT ENTRY

It is stated by the Thomas people that every piece of steel used in the entire construction of their racer is of a special quality and specially heat-treated for the purpose, which greatly increased the cost of construction. The hood, dash and seats—in fact every portion of the frame—are made of light sheet aluminum, intended for racing purposes only, while there are no mud guards on the car. The weight, in racing form and with the tanks empty, is estimated to be 2,250 pounds. The motor develops 115 horsepower at 1,600 revolutions per minute and the four cylinders are cast in pairs, with all the valves on one side. The inlet valves are directly over the exhausts and all are operated from a single camshaft. The bore is 6⅞ inches and the stroke 5½ inches. The crankcase is a one-piece aluminum casting and the crankshaft has three large plain bearings. No fan is used in the radiation system, the radiator being of a special design honeycomb type. The clutch is cone, with a positive lock on high speed, while the transmission is ball-bearing throughout, with three speeds forward and reverse, the latter being operated by a separate lever independent of the four forward speeds. Power is applied to the rear wheels by side-chain drive. An Eisemann magneto furnishes the ignition, while the oiling system consists of a McCord sight pressure feed oiler, which supplies all the main bearings. In the way of brakes there is a foot brake which works on a single drum on the countershaft and which is applied externally. The emergency is internally applied, expanding on rear wheels.

The frame is of channel steel and the springs are half-elliptic. The axles are of I beam construction and the wheels run on ball bearings. The wheelbase is 109 inches, with a 54-inch tread and the wheels themselves are 34 by 4½ inches.



BASLE, WHO WILL DRIVE MODEL M KNOX IN VANDERBILT

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## Europe Looking Towards America

THE days when American motor car designers must search European workshops for the latest improvements in car design, and when they must fashion their motors, clutches and transmissions after the prescribed continental lines are passing. In fact, indications are that the trend is beginning in the opposite direction. European makers have never been slow to adopt the good things brought out on this side of the ocean, although it is a fact that rarely have the French, English or German designers visited this country in search of such; they, nevertheless, have not been slow to adopt many of the good things which the over zealous American inventors have carried across the Atlantic to demonstrate to them.

### Adopts Chicago Motor

A RECENT example of this is the adoption for its 1909 cars, by the Daimler Co., of England, of the valveless four-cycle motor invented and developed by Charles Y. Knight of Chicago, and familiarly known as the Silent Knight motor. With this motor, it has in America been a case of "a profit without honor in his own country," for it has not only taken effort to dispose of cars fitted with such, but the American maker has taken little interest in it. Not so with the foreigner. The Minerva Co. of Belgium, in adopting it, and the Panhard and Fiat Co. in conducting tests with it at the present time, show the avidity with which the recognized foreign makers search for what under test prove to be improvements in design.

### Interested in American Devices

THIS is but one of the many examples of European adoption and imitation of American methods. Another one that is attracting attention at present abroad is the friction transmission system used to such an extent by American manufacturers. For years, France, Germany and England refused to even consider the friction transmission set, but now half a dozen firms are using it, the type of car being of the small variety. The two-cycle problem is another engineering phase which is at present under discussion by French and German engineers, not a few of which are at present engaged upon experimental engines. The air-cooling problem, which at one time was such a considerate factor in American manufacture but which has of late dropped into the background considerably, has never received much attention abroad, although its progress in America has been watched.

### Small Parts Take Well

BUT the American invasion is not limited to these features of design. America's pioneer musical horn manufacturer has planned a general invasion of Europe for the coming season; two or three of the special-style spring manufacturers have similar undertakings planned; a couple of demountable rim makers are contemplating like campaigns; and little is heard of a host of other inventors and manufacturers of small parts who are interesting themselves in the foreign field, all of whom have taken out patents in all European countries and many of whom have completed arrangements with brokers for the direct sale of these, or their disposition on a royalty basis. This unexpected activity is a very accurate thermometer of the status of the American industry from a research and exploiting point of view; and it is natural to expect that, with this creative work accomplished, the executive task of proper manufacture and disposition of the goods will be accomplished with equally satisfactory results. This is upto the promoters.

## The Status of Motor Car Racing

MOTOR CAR racing, at least for the moment, is of some substantial worth to motoring in general. Therefore, it will be a source of general satisfaction to those manufacturers and their agents who bear the brunt of the heavy expense that an agreement has been reached in the so-called racing war between the American Automobile Association and the Automobile Club of America. The exact interpretation of the agreement signed by the officers of the two organizations may safely be left to the lawyers who were involved in the final understanding. It would appear that whatever friction may be engendered for a time by those interested in preventing harmony, will soon give way to the insistence of the common-sense of the men really responsible for the recently reached understanding.

### National Organization Needed

THE need for an organization like the American Automobile Association is absolute and recognized, whether it be composed of clubs, or individuals, or both. The big club in New York city also has its sphere of usefulness, and being located in the metropolis of the country, it possesses certain advantages over the clubs of other cities. The constitution of the international organization provides for only one club from a country, and the A. C. A. unquestionably was in on the ground floor in the pioneer days of motoring and that was how it obtained its "foreign recognition," which it values highly and which it has fought to preserve, and has succeeded in preserving. But the A. C. A. was unsuccessful in inducing the clubs of this country to desert the A. A. A. and acknowledge the New York city organization as the fountain head of national power. Therein it encountered defeat, for the American spirit of the American clubs will not accept the foreign idea of the autocracy of a single club in a country.

### Success to Both Races

THE great thing, however, is that both the Vanderbilt and Savannah races will now be successes—one is needed in the metropolitan district, and the other will be of benefit to the sport and industry in the South. The mere fact that the Vanderbilt race is called "national," though its entry list will be "international" in character, doesn't retract one whit from its prestige, or its value, to whatever maker may be lucky enough to be first across the line. A generous entry is promised in both events, though had the war continued it would have meant unsatisfactory competition and of slight worth to those participating. Therefore, let concern rest with the two big races scheduled, and let the future more or less work out its own problem, for ultimately it will resolve itself into a question of what the manufacturers of America shall decide to support and how they shall support it.

### Road Races Popular

WITH the advent of 1908 road racing in America was popularized by the stock chassis races held by the association. Later the Briarcliff, Lowell and two Denver contests helped matters. Philadelphia is now scheduled and as a climax come the two big events already referred to. The possible danger for 1909 is too many road races—such an overdose as there has been for reliability tours and hill-climbs this season. The economy test craze has almost ceased, and as new schemes arise it is but natural to expect landslides to them as the season progresses.

# NAZZARO MAY DRIVE IN AMERICAN RACE

PARIS, Sept. 10—There is no truth whatever in the announcement made about a month ago that Nazzarro would retire from the racing game this season. The marriage of the modest Italian race driver is fixed for the beginning of next year, but this will not interfere with his racing contract with the Fiat firm. It is now certain that Nazzaro and Wagner will be sent over to handle the Fiats engaged in the Savannah race on Thanksgiving day. Lancia declares he will not be at the wheel of the third car, his own business engagements in connection with the Lancia car making it impossible for him to travel to America. Though no official decision has been arrived at yet, it is exceedingly probable that Duray will have the third car. The Belgian driver is still connected with the Dietrich firm, but as his contract expires very shortly it is believed that he will be able to handle Lancia's Fiat. French participation in the Savannah race is not likely to be great. Dietrich may send two cars, and Bayard-Clement may be represented by Gabriel and one other. As to the others it is practically certain that they will remain at home. Demogeot is looked upon as a likely driver of one of the Dietrichs. Also it is said Lautenschlager positively will drive Robert Graves' Mercedes in the Vanderbilt, after which he will become a chauffeur for W. K. Vanderbilt, it is stated, on the continent.

**Track Meet at Indianapolis**

Indianapolis, Ind., Sept. 21—The first local motor car race meet in 2 years was held at the state fair grounds in this city last Friday and Saturday under the auspices of the Indianapolis Automobile Trade Association. Without doubt the events by local drivers were the most interesting that have ever been seen in the city. Barney Oldfield, Walter Christie and Charles Soules also drove exhibition miles and ran a match race. While the meet was arranged hurriedly, the attendance exceeded expectations and the local association will clear a neat sum as a result. There were more than a dozen events each day and there was only one protest during the meet.

## Italian Denies He Will Give Up the Wheel—Track Meet at Indianapolis—Quakers Get Entries

While the special features attracted no little attention, the chief interest centered around the local drivers. One of the best races was the match between the Stoddard-Dayton, owned by Carl Fisher and driven by Charles Merz, and the Haynes, owned by Paul Smith of the Indianapolis Motor Car Co., and driven by Loring Wagoner. Fisher and Smith are reported to have had a side bet of $1,000 on the match and the Stoddard-Dayton won both 5-mile heats.

The work of the model 10 Buick runabouts, entered by the Buick-Losey Co., was especially interesting. These little cars starred in every race except one and in this, a free-for-all handicap, the Buick, driven by Peterson, was hubbed by the National in making a turn and the latter car was disqualified, giving the Buick third place in the race.

Oldfield lowered his Indiana record of :57⅕, making exhibition miles in :55⅘, :56⅗ and :55. Christie drove miles in :53⅗ and :52⅕, securing the $500 trophy offered by the Indianapolis News for the fastest mile made during the meet. Exhibition miles by Soules were in :59 and :56⅘. Summaries:

Two miles, race for Buicks—W. F. Peterson, Buick, won; Tom Madden, Buick, second; time, 2:37¼.

Two miles, special for Stoddard-Daytons—Charles Merz, model K, won; Jack Reid, model K, second; time, 2:41.

Two miles, equipped touring cars under $3,000—W. F. Peterson, model 10 Buick, won; Charles Merz, model K Stoddard-Dayton, second; time, 2:33 4-5.

Three miles, motor cycles—Walter Berner, Reading-Standard, won; Patrolman A. C. Gibney, Indian, second; time, 3:47.

Three miles, motor cycles—Walter Berner, Reading-Standard, won; A. C. Gibney, Indian, second; time, 3:43.

Three miles, free-for-all handicap—W. F. Peterson, model 10 Buick, 40 seconds, won; Charles Soules, Stearns, scratch, second.

Three miles, motor cycles—A. C. Gibney, Indian, won; John Zink, Thor, second; time, 3:43 3-5.

Three miles, stock cars under $1,500—Tom Madden, model 10 Buick, won; W. F. Peterson, Buick, second; time, 3:57 2-5.

Two miles, equipped touring cars under $3,000—Herbert Lytle, American, won; T. Aitken, National, second but disqualified; William Cameron, Stearns, third; time, 2:14.

Three miles, free-for-all handicap—Charles Merz, Stoddard-Dayton, 15 seconds, won; Herbert Lytle, 5 seconds, second; time, 3:00 3-5.

Two miles, special match—Charles Merz, Stoddard-Dayton, won; Loring Wagoner, Haynes, second.

**Quakers Have Five Entries**

Philadelphia, Pa., Sept. 21—Five bona-fide entries already have been secured for the 200-mile founder's week stock chassis road race, with excellent prospects of the limit of twenty entries, set by the committee being reached before October 7, the date of closing. The quintet already entered are: Maxwell, entered by the Tarrytown factory; American Locomotive, entered by Louis J. Bergdall, who will also drive the car; Stoddard-Dayton, entered by Hamilton Auto Co., Philadelphia agent; Peerless, entered by P. F. du Pont, of Merion, Pa., and Studebaker, entered by the factory and to be driven by Frank Yerger, who guided the Studebaker navy dispatch car to a victory over the Pullman last winter in the Philadelphia-Savannah race. Two Loziers, two Locomobiles, a Pullman, another Studebaker, a Pennsylvania, a Stearns, a Matheson and a Renault are almost sure to be among the starters. Contracts for the building of the grand stands and official stands already have been entered into; they will be located on the south concourse.

9TH INTERNATIONAL
AUTOMOBILE SHOW
OPENS NEW YEAR'S EVE.
Management of AMERICAN MOTOR CAR MFRS. ASSN.
DEC. 31ST TO JAN. 7TH
GRAND CENTRAL PALACE
43RD ST. & LEXINGTON AVE. NEW YORK.

NEW PALACE SHOW POSTER

## CALENDAR OF MOTORING EVENTS

**Southwestern Reliability**—Eight-day reliability run of Automobile Club of Kansas City, September 19-26.

**Massachusetts Test**—Bay State Automobile Association's 24-hour endurance run, September 23-24.

**Four-Inch Race**—"Four-inch race" for Tourists' trophy, on Isle of Man, September 24.

**Milwaukee Meet**—Second annual track meet of Milwaukee Automobile Club, September 25-26.

**Voiturette Race**—Voiturette contest promoted by French L'Auto, September 27.

**Michigan's Tour**—Annual contest tour of Michigan State Automobile Association from Grand Rapids to Detroit and return, September 27-29.

**Indianapolis Run**—Two-day reliability run at Indianapolis, October 1-2.

## IN THIS AND OTHER COUNTRIES

**Thousand-Mile Reliability**—Chicago Motor Club's 1,000-mile reliability run, postponed from June, October 6-9.

**Fairmount Park Road Race**—Quaker City Motor Club's 200-mile road race in Fairmount park, Philadelphia, October 10.

**Parkway Opening**—Series of sweepstake races to mark opening of Long Island motor parkway instead of Vanderbilt eliminating trial, October 10.

**Road Congress**—First international road congress and exhibition in Paris, October 11.

**Cleveland Reliability**—Three-day reliability run of Cleveland Automobile Club, October 14-16.

**Vanderbilt Cup Race**—Vanderbilt cup race on Long Island motor parkway, October 24.

**Light Car Race**—Automobile Club of America's light car race at Savannah, Ga., November 25.

**Grand Prize Race**—Automobile Club of America's grand prize race at Savannah, Ga., November 26.

# SOUTHWESTERN RELIABILITY FAR FROM EASY

KANSAS CITY, MO., Sept. 19—The great southwestern reliability run, promoted by the Automobile Club of Kansas City and with the Kansas City Star cup as the chief trophy, made an auspicious start this morning, with Emporia for the first night's stop. There were thirty-one cars in line carrying 110 passengers and the tour will last 8 days, in which time the contesting cars will travel 920 miles. Ten of the cars entered were scratched, those declining the issue being: No. 8, Stevens-Duryea four; No. 24, Pilain; No. 25, Chalmers-Detroit 30; No. 26, Knox; No. 29, Chalmers-Detroit 30; No. 32, Stoddard-Dayton; No. 33, Gleason; No. 34, Acme; No. 40, Stoddard-Dayton; No. 41, Ford six.

**First Day's Run to Emporia**

Emporia, Kan., Sept. 19—Masked riders flitted across the Missouri line into Kansas this morning and when twilight commanded a halt, the main body of invaders was encamped on the Emporia main street, called Commercial. Raising a cloud of dust which hung heavy over the countryside minutes after they had passed, the cars in the fall endurance run of the Automobile Club of Kansas City sped into this city. For most of the cars the trip was not fraught with the difficulties which commonly attend strenuous touring. Not wishing to take chances, the drivers almost invariably made the early part of the trip in a hurry, running slowly into noon and night controls. On this, the first day of the tour of a week and a day, the schedule was so easy that some cars waited outside the controls at Ottawa and Emporia for an hour or more.

As the cars checked in at Emporia they were put through their paces before being given a clearance for the night. W. G. Coumbe of the touring committee and Pilot McNamara of the official car made the inspection. This was only cursory. After cars had been released, they were turned over to contestants to have and to hold until tomorrow morning's start.

It is this feature of the run which has caused some criticism. The arrangement permitted a car being repaired or rebuilt, for that matter, between night and morning. In most runs of this sort the cars are parked for the night and no one may touch them until they are checked out in the morning. The system in use on this run makes of it eight endurance runs of 1 day each.

So far as the early arrivals reported, it could be seen that the first day's running would find clean scores for more than twenty-five of the thirty-one starters. These numbers were scratched before the start: 8, 24, 25, 26, 29, 32, 33, 34, 40, 41.

Outside of the cars which had not reported on the schedule mentioned above, the only penalty imposed was 10 points on No. 15, a Packard touring car. This car started out early in the morning to run rings around everybody but the pilot car, with the result that it came into Emporia more than an hour before its checking time. The engine choked down and stopped on Main street, 50 feet from the control. John Chancey, the driver from the Packard factory, said poor gasoline did it. The penalty against the car was assessed for this motor stop.

At the Ottawa noon control and again at night, punctures were reported by one of the White cars, the Maxwell No. 14, Lott's No. 11 and a dozen others. A puncture means little, however, when the early part of the journey is made at a fast clip so that there is plenty of time to make repairs. Quick detachables may be worked in as few as 7 minutes. And they were.

While the method of keeping scores practically placed every driver and the occupants of his car on their honor, not a case was reported of anyone having taken advantage of this rule. Neither was the rule limiting the actual working force of each car to two persons violated.

There were glad hands all the way from the time the immune zone within 10 miles of Kansas City had been traversed. At Emporia, as the cars rounded into the main street, the town band was playing, pretty girls lined the sidewalks and the freedom of the city was handed out to the tourists in big slices. It was a reception such as a city of this size seldom gives.

But there were others. Not to speak of the reception at Ottawa, where Lyman Reed and his assistants took care of the tourists in capital shape, there were others. For instance, there was Williamsburg. It lies out of Ottawa quite a distance towards Emporia. At the out croppings of the town, standing in the middle of the road, was a man. He waved his hand. He reached over to the occupant of the front seat who was not driving. He deposited in said tourist's hand a slip of paper, neatly typewritten. The slip gave full directions for the tortuous course through the town. Thanks, nameless guide!

But for glad hands, one Mr. Pursley, living 26 miles out of Emporia on the side before you get there if you come from Ottawa, is the real ten fingers. Cars speeding by his place were brought to an abrupt stop by the display of a large paper sign, stuck on a post at the side of the road. In letters 2 feet high, the sign shouted: "Slow." And the paint was red, at that.

**Cars Reach Wellington**

Wellington, Kan., Sept. 20—Of the thirty-one cars which started in the southwestern reliability run yesterday morning, twenty-nine reached this city tonight and will leave tomorrow morning for Enid, Okla. That town will be reached at shortly after 1 o'clock and the afternoon will be devoted to a rest. Out of the twenty-nine cars still running, only twenty-two have clean scores at the end of this, the second day's running. The other seven have penalties varying from 25 to more than 300. If the process of penalization proceeds at the same average that has been maintained for the past 2 days, there will not be a clean score.

Curiously enough, two of the cars which have suffered started out under the guidance of drivers well known to the world of contests. In neither case, however, may the fault be laid to the driver. The cars spoken of are the Reo, driven by McDowell, and a White, piloted by Hal Sheridan. The Reo was penalized during the run today for making engine adjustments. It was assessed 25 points. The White had to drop out at Emporia, which was the first night's stop.

To understand the accident to the White, it must be understood that the rules governing the 920-mile run make of the contest really eight endurance runs of 1 day's duration each. After passing inspection and checking at night, the cars are turned over to their owners for use during the evening. This naturally permits of any garage work the contestant may wish to do. During the day's running every adjustment is penalized 5 points, every repair 10 points and every replacement 15. Sheridan's car had checked in clean the first day, but in the evening, piloted by W. B. Rhemick of the White forces, with Sheridan as a passenger, it toured the surrounding country. In trying to avoid a team, the car went into the ditch and turned over. Both men escaped serious injury, the damage done being two tire casings ripped off.

The first day's running was from Kansas City to the noon control at Ottawa and then to Emporia, the night stop, a total distance of 125 miles. For the most part the roads were fair, but extremely

**STANDING OF RUN TUESDAY**

| | |
|---|---|
| 1—Premier six | Pilot |
| 2—Stevens-Duryea six | 980 |
| 3—Peerless | 996 |
| 4—White | Withdrawn |
| 5—White | Withdrawn |
| 6—National | 915 |
| 7—Pope-Hartford | 879 |
| 9—Studebaker | 855 |
| 10—Overland | 975 |
| 11—Premier | Withdrawn |
| 12—Maxwell four | 1,000 |
| 13—Corbin | 1,000 |
| 14—Maxwell four | 980 |
| 15—Packard | 960 |
| 16—Cadillac four | 980 |
| 17—Maxwell two | 911 |
| 18—Reo | Withdrawn |
| 19—Premier | Withdrawn |
| 20—Chalmers-Detroit thirty | 1,000 |
| 21—Peerless | Withdrawn |
| 22—Moon | 1,000 |
| 23—Chalmers-Detroit forty | 928 |
| 27—Maxwell four | 1,000 |
| 28—Buick ten | 681 |
| 30—Brush | 993 |
| 31—Rambler | 1,000 |
| 35—Ford four | 1,000 |
| 36—Ford four | Withdrawn |
| 37—Franklin six | 980 |
| 38—K. C. Wonder | 605 |
| 39—Knox | 989 |

dusty. From Emporia the tourists made Wellington on the second day, a total distance of 155 miles, with the noon control at Newton. All these cities are in Kansas. All the roads are dirt, although some sand has been traversed near Wellington and plenty more is coming in Oklahoma.

In a general way, the rules provided a certain running time between controls. Then they penalize adjustments, repairs and replacements. The penalties for damaged parts—fenders and the like—are the same as in the Kansas City-Topeka endurance run last June. In effect, the tour in a 1-day "sealed everything but tires" test. Only two men to a car may make repairs, even to tires. The observers are the passengers of the car, all of whom must sign the report each night.

Besides the White, there was a withdrawal at Emporia of a Premier roadster, entered by Frank Lott, of Kansas City, not in the trade. Mrs. Lott was also of the party. The car was penalized 374 points the first day, owing to making the night control late. Lott had many and varied tire troubles, which kept him on the road more than an hour after he should have finished.

A. C. Wurmser's National lost a clean score by inattention. This car had a puncture at Olathe, a distance of 20 miles from the start. In making the repair, the motor was stopped. The rules require the motor to be running at all times between controls. The penalty against this car was so assessed.

In filling the gasoline tank of the Packard, No. 15, entered by E. P. Moriarty and driven by John Chancey, a hose was used the first day. Result—rubber in the carbureter—10 minutes motor stop and penalty for adjustment, making a total of 15 against this car.

Carbureter troubles also were the bane of T. C. Brown's Peerless. In 2 days the car has lost 180 points. C. F. Ettwein's home-made car, a runabout-truck with large wheels, but fitted with pneumatics, has been penalized 385 points for time lost at controls and adjustments. H. F. Worth's Buick got 19 points for time the first day.

The cars running include a Stevens-Duryea light six, Peerless, National, Pope-Hartford, Studebaker, Overland, Premier, driven by Hammond; four Maxwells, all with clean scores at the end of the second day, including the little runabout, large and small Chalmers-Detroit, Moon, Buick, Knox, Brush runabout, Rambler, Ford, including the small runabout, and a six-cylinder Franklin.

**Only Seven Left Perfect**

Oklahoma City, Okla., Sept. 22—Special telegram—Only seven perfect scores out of a total of thirty-one starters remained tonight when the inspection of cars had been finished at the checking station of the fourth night of the southwest reliability tour, which is being run under the direction of the Automobile Club of Kansas City. There were twelve this morning, but five lost points during the day. The tour is now half finished. Since leaving Wellington the tourists have encountered the 2 hardest days of the tour. From that city the control at Enid, Okla., was considered an easy morning's run. But the roads decreed otherwise. The tourists encountered a string of ponds, and as it is dangerous, because of quicksand, to leave the middle of the road in that section of Oklahoma, it was necessary to plow through 3 feet of mud and water for distances varying from 50 feet to 50 yards. In this largest bayou there were stuck fast a Maxwell runabout, a Studebaker, a Premier and a Chalmers-Detroit 40 roadster. Four mules towed them out. The Studebaker had tried to pass another car and went into the quicksand by the side of the main path. When four mules came to the rescue the radiator cap was the only place left to which to hitch. At another puddle the Peerless No. 3 passed the Packard a tow line.

When the cars reached Enid, among them the Pope-Hartford, which also stuck, but at another place, H. E. Rooklidge, entrant of the White and Premier cars, asked that the cars which ran around the puddles be penalized or that the day's scores be declared void between Jefferson and Pond Creek, where the mudholes were. This the committee refused to allow, saying that it had sent back word that the detour might be made. The Chalmers-Detroit 30, the Franklin, the Brush, Fords and others avoided the mud. Among those which went through the big slough were the Stevens-Duryea, Peerless, Packard, Cadillac, three Maxwells, Corbin, Moon, White and others. Upon hearing the decision of the committee, Rooklidge withdrew his entries, a White, Premier and Reo. The first named toured today as a non-contestant, but the others left Enid this morning for Kansas City.

In addition to these withdrawals two other cars left the run. The Peerless No. 21, which had been having a bad time because of carbureter troubles, broke a crankshaft before reaching Enid and shipped back to Kansas City. No. 36 Ford runabout ran into a dog before reaching Enid and broke a front spring. It was fixed at a blacksmith shop and ran into Enid, but went no farther.

In the run today, which was from Enid to the noon control at El Reno, 80 miles, and from there to Oklahoma City, 40 miles, there was more mud, but the runing was easier. No 2 was penalized for a motor stop, its protest that the carbureter was tampered with during the night stop being overruled. No. 4 was penalized for the loss of two fender bolts; No. 14, on which the Motor Age correspondent is handling the wrench, sprung an axle. The Franklin had to replace a spark plug. The Knox got behind a backing horse and came in with a damaged radiator. All these cars had had perfect scores until this evening.

**CARS COMPETING IN THE RUN AND THEIR PASSENGERS**

No. 1, Premier—W. G. Coumbe, H. G. Blake, Frank P. Frost, John McNamara.
No. 2, Stevens-Duryea—Entrant, J. F. Moriarty; occupants, J. F. Moriarty, Frank P. Ewins, William Peet, J. C. Caps.
No. 3, Peerless—Entrant, Dr. G. A. Beedle; occupants, Dr. Beedle, W. P. M. Stevens, George Mangson, Heine Holzhauer.
No. 4 White steamer—Entrant, H. K. Sheridan; occupants, Mr. Sheridan, Walter Reineick, R. H. Johnston, S. J. Street.
No. 5, White steamer—Entrant, W. R. Lieth; occupants, Mr. Leith, E. R. Jones, B. E. Nace, G. B. Flack.
No. 6, National—Entrant, A. C. Wurmser; occupants, Mr. Wurmser, Otto Regehein, I. Gottlieb, Miss Aimee Wurmser, Miss Jennie Gottlieb.
No. 7, Pope-Hartford—Entrant, William Bucholtz; occupants, Mr. Bucholtz, C. A. Muehlebach, Jack McAvoy, William Hunter.
No. 9, Studebaker—Entrant, W. L. Walls; occupants, W. M. Goodrich, F. W. Sanborn, George D. Griffith, E. R. Carpenter.
No. 10, Overland—Entrant, H. G. Kirkland; occupants, Mr. and Mrs. Kirkland.
No. 11, Premier—Entrant, Frank E. Lott; occupants, Frank E. Lott, Mrs. Lott, Charles Corcoran.
No. 12, Maxwell—Elliott H. Jones; occupants, Mr. Jones, Scarritt Jones, Harry Hathaway, Dr. J. A. Robertson.
No. 13, Corbin—Entrant, Fletcher Cowherd, Jr.; occupants, H. S. Hargrave, Webster Withers, Jr., E. L. Blake, Joseph Matson.
No. 14, Maxwell—Entrant, W. S. Hathaway; occupants, Charles Levendaski, P. A. Sutermeister, I. E. Bernheimer, Albert Schoenberg.
No. 15, Packard—Entrant, E. P. Moriarty; occupants, Mr. Moriarty, John Chancy, H. R. Palmer, A. B. Chapin, C. W. Fletcher, M. C. Nolan.
No. 16, Cadillac—Entrant, R. C. Greenlease; occupants, Mr. Greenlease, Clyde Archbaugh, C. J. Goetze, J. R. Lipscomb.
No. 17, Maxwell—Entrant, J. A. Holtzman; occupants, Mr. Holtzman, W. L. Tabb.
No. 18, Reo—Entrant, H. E. Rooklidge; occupants, C. W. McDowell, C. D. Mayhugh, John Eubank, M. Dickson.
No. 19, Premier—Entrant, H. E. Rooklidge; occupants, Mr. Rooklidge, H. L. Hammond, J. C. Christopher, George M. Gilson.
No. 20, Chalmers-Detroit—Entrant, Joseph Moriarty; occupants, Mr. Moriarty, J. H. Stickney, George McEntyre, B. H. Akers.
No. 21, Peerless—Entrant, T. C. Brown; occupants, Mr. Brown, J. R. Caston, Louis Denhard, Glen Moran.
No. 22, Moon—Entrant, C. B. Merrill; occupants, Mr. Merrill, H. C. Merrill, B. Howlett, J. W. Ferguson, Richard Schug.
No. 23, Chalmers-Detroit—Entrant, J. B. Porter; occupants, J. B. Porter, Ernest Lesley.
No. 27, Chalmers-Detroit—Entrant, W. S. Hathaway; occupants, Carl J. Simons, George L. Hathaway.
No. 28, Buick—Entrant, H. R. Worth; occupants, Mr. and Mrs. Worth.
No. 30, Brush—Entrant, Dwight B. Huss; occupants, Mr. Huss, F. A. Harris.
No. 31, Rambler—Entrant, J. E. Anderson; occupants, Fred Collier, G. Landam.
No. 35, Ford—Entrant, Charles M. Norris, Olathe, Kas.; occupants, Mr. Norris, Oria A. Gordon, B. B. Weldeon.
No. 36, Ford—Entrant, C. A. Boyd, De Soto, Kas.; occupants, Mr. and Mrs. Boyd and Master Frank Boyd.
No. 37, Franklin—Entrant, L. A. Robertson; occupants, Mr. Robertson, H. H. Herr, D. J. Cunningham, C. Talbott.
No. 38, Kansas City Wonder—Entrant, C. F. Ettwein; occupants, Mr. Ettwein, E. Moon.
No. 39, Knox—Entrant, F. L. Woodward; occupants, Mr. and Mrs. Woodward, Mr. and Mrs. R. W. Freyschlag.

# ENGINEERS HOLD A QUARTERLY MEETING

CLEVELAND, O., Sept. 19—From early Friday morning until tonight, when the third quarterly meeting the Society of Automobile Engineers formally broke up with the conclusion of the dinner tendered to the members by the Timken Roller Bearing Axle Co. at the Courtland house in Canton, the visitors have been made to feel contented every moment of the time they were in the hands of their friends, and the combined efforts of the entertainers left nothing to be desired. The result was one of the most enjoyable occasions in which the members of the society have ever participated.

As the quarterly meetings only extend over 2 days, the first thing on the program was a number of factory visits Thursday morning in order to bring the business meeting and technical sessions in the afternoon. In a number of Winton, Stearns, Peerless and White cars the party got away from the Hollenden about 9:30, the first plant on the list being the Winton, where the engineers were welcomed by Mr. Henderson. After having spent an hour or so there in examining the various factory methods employed, as well as the details of the design of the new Winton cars for 1909, a number of which were coming through, the cars were again taken for a visit to the plant of the Standard Welding Co., situated in another part of Cleveland. The invitation to inspect the plant was extended by Mr. Gorton, of the Standard company, and after having viewed some of the various forms of electric welding as applied to rims, axles and tubular work, the regret that more time could not be devoted to the visit was universal, but in view of the fact that no fewer than six different plants situated in widely separated parts of the city had to be visited in a very limited time, it was impossible to devote more than passing attention to any of them. From the Standard company's plant the cars were again taken for a visit to the Peerless factory, and at this, as well as at a number of the other plants visited, the fact that the slump of a year ago has been completely forgotten is more than evident in the number of large and permanent additions to the different factories that are now in course of construction, while the manner in which the 1909 cars are already coming through shows that the demand for new machines is making itself felt in no uncertain manner early in the season. After an hour or so at the Peerless plant the cars were once more taken, and when the photographer had finished repeating his efforts of earlier in the morning, they were headed for the plant of the Hydraulic Pressed Steel Co., at the invitation of F. G. Foster, one of the members. It was intended to have had some of the special operations of motor car frame pressing on the huge hydraulic presses, for which this plant is noted, under way during the visit, but owing to Cleveland's unusually early dinner hour, 11:30, this was impossible.

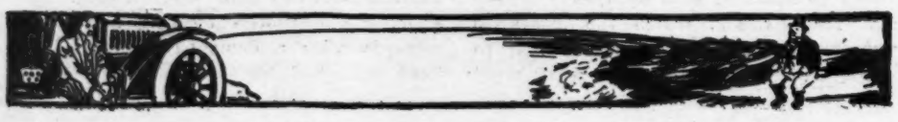
As a matter of fact so much more time was spent in visiting than had been allowed for that at the hour set for lunch there were still two plants at widely separated points to be gone through, so that at the suggestion of J. G. Sterling, of the Stearns company, and chairman of the local committee, it was decided to omit the visit to the plant of the F. B. Stearns Co., owing to the great distance from the Hollenden. This gave more time to see the working of the White plant, though what was left constituted but a fraction of the time that could have been profitably spent there, as it was the universal consensus of opinion that nothing finer in the shape of systematic arrangement and factory organization had been seen. The members were met at the plant of the White company by Windsor and Rollin White, who together with some of the technical members of the company's staff, acted as guides during the tour of the widespreading plant, all of which, with the exception of the large administration building, now nearing completion, is of one story and of the saw-tooth type of construction. The distinguishing feature of the layout of the plant, consisting of a 50 by 600-foot skylighted alley, by means of which any of the numerous departments may be reached without going through any other, came in for a great deal of favorable comment, as did also numerous other features of the carefully arranged factory, which gave evidence of the pains spent in planning it so as to insure not alone the maximum capacity for turning out work, but likewise the greatest comfort and convenience for the workmen.

An opportunity was also presented to examine the details of the power plant of the White car for 1909, which has been greatly simplified by the adoption of the Joy type of valve gear, this permitting the shortening of the crankshaft to an extent where but two annular ball bearings are now employed in place of eight.

Following the visit to the White plant the engineers were taken back to the Hollenden, where a lunch was served in the dining room of the Automobile Club of Cleveland, at the invitation of E. E. Allyne, of the Allyne Brass Works, Cleveland, and a member of the society. Upon the conclusion of this the members adjourned to the assembly room of the Hollenden for the business meeting and technical sessions. The meeting being a quarterly one, there was but little routine business to come in for attention, the chief items being the rehabilitation of the committee on international memberships, owing to the resignation of the chairman, and the appointment of nominating and local committees—one to prepare a ticket for the annual election to be held in connection with the fourth annual meeting, which will take place in New York city during the shows, and the other to take up the matter of arrangements and entertaining on the same occasion. The nominating committee is composed of H. M. Swetland, chairman; A. L. Riker, H. E. Coffin, H. F. Donaldson and H. W. Alden, and will be called upon for its report about 60 days in advance of the election.

The business meeting was followed by the technical sessions, and although the number of papers presented as well as the time available for discussion was short, they proved of considerable interest and will doubtless lead to further contributions along similar lines. The first paper was on "The Limitations of the Universal Joint," by H. Vanderbeek, and consisted of a study of the characteristics of this familiar mechanism, as well as its use on the motor car, raising the question of the desirability of one or two universals on the propeller shaft of a car, from a theoretical as well as a practical point of view. In connection with his paper Mr. Vanderbeek had constructed an ingenious model to prove his theories, and this was shown and explained at the conclusion of the discussion, which brought out a number of interesting points. Following this there was presented by President Fay a paper on "What Carbon Does to Automobile Steel," in which the author showed at some length the desirability of low-carbon steel for motor car work, particularly where dynamic stresses have to be borne, pointing out at the same time the relation of low-carbon, unalloyed steels to both high and low-carbon alloyed steels where their value for motor car construction was concerned. The subject is one upon which a great deal has been written, though not from this particular point of view, and a discussion of the various points involved could be carried on almost indefinitely.

A paper on the subject of "Power Transmission on the Automobile" was to have been prepared and read by L. M. Dieterich, but owing to his illness he was unable to finish the paper in time for the publication of the transactions of the society, or to attend the Cleveland meeting. The third paper presented was entitled "What Is the Best Timing?" and consisted of a translation from the French of Omnia, by Charles B. Hayward. The



French author, Louis Lacoin, as the result of the appearance of a device known as the Larrad, made a critical study of the requirements of motor valve and ignition timing, comparing them both with the formula prescribed by Larrad, the inventor of the device, as well as with the standards adopted by no fewer than thirty well-known French builders, who have turned out thousands of motors in the past few years. The principal purpose of the translator was to bring up discussion and lead to further contributions on a subject that has been neglected to a very great extent by the members of the society in the past, but, as the paper itself showed, there are so many points involved, not a few of which require study for their proper consideration, that it is impossible to discuss the subject satisfactorily at any length except in the shape of written contributions, a number of which were promised. Following the conclusion of the technical sessions, the meeting was adjourned to reconvene at a dinner given by the society to visiting members, in the rooms of the Automobile Club of Cleveland, in the Hollenden.

At the invitation of the B. F. Goodrich Co. and the Diamond Rubber Co. the society made a visit to Akron, 30 miles distant, in order to inspect what are said to be the largest rubber works in the world. The concerns in question provided a special car on the electric interurban system, and this appeared in front of the Hollenden promptly at 7:40 a. m., according to schedule. The members were all on hand, and after a pleasant run of a little less than 2 hours were landed right at the door of the B. F. Goodrich Co.'s plant, where a number of the technical staff were impressed as guides, in order to give the visitors as comprehensive an outline of the multitudinous operations carried on in a rubber manufacturing plant of such extensive

proportions as was possible in the limited time at their disposal, as both the Goodrich and the Diamond plants had to be visited between 10:30 and 12:30, the hour set for the lunch at the Akron Country Club. Urgent invitations from both the Goodyear and the Firestone companies to inspect the workings of their plants had to be declined for the same reason, as well as the fact that the former had not been received until it was too late to make any change in the plans for the trip to Akron. The representatives of the local committee, consisting of Chairman Sterling and H. W. Alden, accompanied by Secretary Hayward, made a visit to the plant of the Firestone Tire and Rubber Co., where they were presented with an attractive souvenir in the shape of a neat stop watch for each of the visiting members. To commemorate the date of the meeting and visit, the watches are engraved, "Firestone, September 19, '08," on the case.

Even by going through "on the high" for every step of the way, it was well-nigh impossible to give the visitors more than a sketch outline of the great variety of rubber "industries" housed in the plant of the Goodrich company. They really deserve this title, as apart from the fact that the production of an article having rubber as its foundation is the basis of all of them, they not only differ greatly, but require for their housing buildings that are respectable-sized factories in themselves. Needless to add, this is particularly true of the tire end of the plant, where the thousands of solid and pneumatic tires turned out every day have an enormous value. Few if any of the members had ever had an opportunity of visiting a tire-making plant, so that the numerous operations, and particularly the preparation of the crude material, were found to be extremely interesting. Starting with the making of solid tires, the visitors were given at least a brief view of every one of the twenty-odd departments, which, in the aggregate, employ between 3,000 and 4,000 operatives the year round, before bidding farewell to the Goodrich establishment and walking across the intervening space that separates it from the Diamond Rubber Co.'s works. It might be thought that seeing one rubber factory was equivalent to seeing all, but where both solid and pneumatic tires are concerned particularly, each plant has methods and arrangements of its own that become of more than the usual interest when contrasted with the different methods of accomplishing the same ends to be seen in the other plants. On this account it was generally regretted that a whole day could not have been spent in Akron. However, the factories not only close for the day on Saturday at 11:30, but it was planned to spend the afternoon in Canton, at the invitation of the Timken Roller Bearing Co.

At the plant of the Diamond company a good idea was obtained of the various processes through which Diamond tires go before emerging as the finished article, ready to be applied to a car, and the members were greatly interested in the large amount of special machinery used in the manufacture of other articles of rubber, and particularly that employed for insulating electric cables. Tire-making, as a matter of fact, is almost entirely a matter

ENGINEERS VISIT PLANT OF TIMKEN ROLLER BEARING CO. AT CANTON, O.

of hand work, which, together with the high grade of the rubber necessarily employed, accounts for the great expense of manufacture. Immediately upon the conclusion of the visit to the Diamond plant, a number of cars were boarded for the run to the Akron Country Club, where the members were the guests of the two companies at luncheon. Following this the special electric car was again boarded for the run to Canton. At the terminus of the line the visitors were met by a special delegation from the Timken plant. The various operations involved in the manufacture of the well-known Timken roller bearings were then inspected, as well as the die-forging of single-piece front axles, manufacture of gears and other processes necessary to the turning out of complete front and rear axle units, the new one-piece, pressed-steel, trussless rear axle driving unit that is being made for the 1909 model cars coming in for a great deal of favorable attention.

After having made a pretty thorough inspection of the workings of the various departments of the Timken plant, the visiting members were guests of the company at a dinner given at the Courtland house, Canton, upon the conclusion of which the meeting came to an end. A vote of thanks was passed and the secretary was instructed to forward a copy of the resolution to each of the many companies that had done so much to entertain and instruct the visiting members.

### THIRD WIN FOR WHITE

Los Angeles, Cal., Sept. 20—Special telegram—For the third consecutive time H. D. Ryus has won the Fenner gold trophy, hung up in the annual century race to North Baldy peak in the Sierra San Antonio mountains, turning the trick today in a White steamer, which car he also drove in the two previous events. Ryus made the 100 miles in 3:34:00, as against the previous record of 4:30:00. Bert Latham in a Kisselkar was second in 4:13:00. The road used is one of the most remarkable courses ever driven over. Two mountain ranges have to be scaled and the last 19 miles is up the side of one of the Old Baldy peaks, the finish being at 6,500 feet. For the first 30 miles the road runs along the famous San Fernando valley, always rising until it suddenly darts into the mountains and cuts through one of the most remarkable mountain passes in America—Fremont pass, with its 45 per cent grade part of the way and perpendicular walls even at the summit. Then the road follows up the course of the Santa Clara river for 30 miles until, after climbing over the mountains at Vincent pass, the great Mojave desert is reached. Through the Solidad pass the river winds its way. There is a 30-mile run across the desert, by then the great mountains are entered by the Big Rock creek canyon for the 9 miles of winding trail to the end of the road at the Buck Horn mine.

## MAKING A MOTOR ROW

### Minneapolis Dealers Are Locating on Hennepin Avenue—New Stores Are Planned

Minneapolis, Minn., Sept. 21—Several deals for new locations by local agents bring out the fact lately that Minneapolis is soon to have a motor row well worthy of the name. Hennepin avenue, the main thoroughfare of traffic and the blocks between Seventh and Ninth streets is the locality referred to. Property values, as a result of the movements announced by the various firms, have taken a jump skyward, an increase of 25 per cent in values and rents having resulted from the recent operations. Five agencies have secured locations there. The first to announce a change was the Stoddard-Dayton, which is having a new garage building erected next to the corner of Hennepin avenue and Eighth street. This building has a frontage of 35 feet on Hennepin with a depth of 140 feet, the building to be 70 feet wide in the rear. The building will afford ample room for salesroom, repair department and storage and will be one of the most complete buildings of its kind in the northwest. The Carroll Investment Co. is financing the deal, and the building will be ready this fall, it is thought.

Directly across the street will be a $20,000 garage building erected for the E-M-F, Studebaker and Babcock electrics, handled by the Minnesota Motor Sales Co. This garage building will be elaborate and showy, white tiling and ornamental brick being used. On top of the announcements of the improvements planned by the Stoddard-Dayton and the Minnesota Motor Sales Co. came the closing of a deal by the Maxwell-Briscoe combination for the erection of a $20,000 building to be used as a wholesale and retail distributing point for the big northwestern business of this concern. The building will be 50 by 150 feet at the corner of Hennepin avenue and Ninth street. Before announcement is made of the plans, President Benjamin Briscoe and W. S. Hathaway, western manager for the company are in Kansas City and other places looking over the latest garage buildings and getting ideas. Minneapolis was chosen by the Maxwell-Briscoe company as one of its branch distributing houses, after careful consideration of many cities claiming attention, and Minneapolis was chosen because of the shipping facilities and general condition of business here.

The most extensive deal recently consummated is that of the Pence Automobile Co., handling the Buick and Stevens-Duryea. Announcement was made during the past week that a site had been acquired at Hennepin and Eighth street for $60,000, formerly owned by the Mutual Life Insurance Co. At one time a twenty-one-story building was planned for this site and the foundation laid, but the project was abandoned. This foundation will be used for the six-story Pence building which will cost, complete, $75,000. All the Buick business for North and South Dakota, Wisconsin, Montana and Minnesota, will go through the Minneapolis branch. Mr. Pence is now in the east making a tour of the principal cities gathering data and ideas, and work will be started immediately on his return, about October 15. The new six-story building will have the offices, salesroom and garage on the first floor; machine shop and repair shop on the second floor; paint and furnishing rooms on the third and fourth floors, woodworking, upholstering and top departments on the fifth floor and the top story will be used for storage. The building will be fire-proof and will be equipped with its own lighting and heating plants. Another feature will be the opening of a jobbing department for all accessories, from which the trade will be supplied direct. When the plant is in full operation it will employ between 100 and 150 men, it is estimated.

The Winton Motor Carriage Co.'s local representatives have recently closed a deal for a new garage building which will afford them much needed space for their increasing business. A new building has been started at 16-18-20 and 22 Eighth street north, just off Hennepin avenue and within the radius of the new center of the motor trade. This building will be one-story at present but the foundation and steel frame work will be so constructed as to permit of four or more stories being added in the future. The building will be completed by October 15 and will do much toward adding to the importance of the motor row.

### BUICK-JACKSON DUEL

Harrisburg, Pa., Sept. 21—Saturday's races of the Motor Club of Harrisburg at the Middletown ½-mile track developed into a duel between the Jackson and Buick entries, and honors were about even at the close. There were but two entries in the 25-mile free-for-all, and after going 5 miles Roy Stains and his Pullman were left to "beat it" alone; the officials called the Pullman off at the end of 10 miles and awarded Stains the cup. Stains later established a new track record of 1:20—a cut of 6 seconds. The track was in poor shape. Summary:

Five miles, runabouts, $1,000 and under—Ben Zimmerman, Buick, 18-horsepower, won; Paul Messner, Jackson, 18-horsepower, second; time, 8:16.

Five miles, gasoline stock touring cars, $1,200 to $2,000—Chester Smith, Jackson, 20-horsepower, won; John Heffelman, Buick, second; time, 12:56.

Five miles, gasoline stock runabouts, $1,000 to $2,000—Chester Smith, Jackson, 20-horsepower, won; Ben Zimmerman, Buick, second; time, 8:09.

Ten miles, handicap, free-for-all, gasoline cars—John Richley, Buick, 18-horsepower, won; Ben Zimmerman, Buick, 18-horsepower, second; time, 15:18.

Polo race and gymkhana, 20 miles, with stops for dressing and other features—Paul Messner, Jackson, 18-horsepower, won.

# BUY A CHICAGO MOTOR

## Daimler People Will Use Silent Knight Engine in 1909—So Will the Minerva People

Chicago, Sept. 21—Announcement was made today by Knight & Kilbourne, of Chicago, manufacturers of the Silent Knight valveless motor, that a deal had been consummated in England by Charles Y. Knight, designer of the engine, whereby the Daimler Motor Co. will equip all its cars in 1909 with the Silent Knight motor. Also it is announced that the same engine will be used by the Minerva people in Belgium, that deal having been closed some time ago. Other foreign concerns are investigating the merits of the idea and it is said it is not at all improbable that the Chicago-made engine will be adopted by some of the leading makers on the continent. At the present time the Panhard people are conducting a series of tests at their factory and it is said that so interested are the Fiat makers that they have sent their designers to Paris to watch the experiments at the Panhard factory. The makers of the Mercedes, too, have asked to be shown the merits of the idea.

The Silent Knight motor first was brought out in Chicago by Knight & Kilbourne, who put it in the Silent Knight car built by them for a couple of seasons. The Silent Knight was a competitor in the 1906 Glidden and also has been exhibited at the Chicago show. Early in 1907 Mr. Knight succeeded in interesting the Daimler people in his engine and last November he went to England to demonstrate it at the Daimler works. He has been there since, in which time the Daimler engineers have gone over the engine and while retaining the cardinal principles, they have thoroughly remodeled the motor. As is well known to those who examined the Chicago motor at the shows, the principle embodied in the engine is the elimination of the ordinary tappet valves and the substitution of sliding ports by means of two sliding sleeves working between the water-jacket and the cylinder proper and operated by an eccentric motion, opening ports in the cylinder walls as the surfaces pass over each other. The head of the motor is detachable and efficiently water-cooled and the spark plug is placed exactly in the center of the head. Each cylinder of the motor has an explosion every two revolutions instead of one at every revolution; otherwise it is credited with having all the good points of the two-stroke engine without any of its drawbacks.

With the Silent Knight engine gas is drawn in on the induction stroke, the inlet port being closed by the sliding sleeve and it is asserted the inlet and exit of the gases through the ports are easier and more direct than through the ordinary valve opening.

The remodeling of the Silent Knight motor by the English engineers, aided by Mr. Knight in person, brought about the elimination of a third port, which had been used as an auxiliary exhaust outlet at the bottom of the stroke, but which had been deemed unnecessary by Designer Knight long before he went to England. This was the principal change made by the English, who now claim that the engine is really silent in action, for, with the exception of the exhaust, there is nothing to make noise, the movements being of a gradual and sliding order and there being no tapping movements or spring return operations. It also is said that the tests of the 38-horsepower motor have developed over 70 on the brake.

### PROMINENT TIRE MAN DIES

Hartford, Conn., Sept. 22—Special telegram—Valentine B. Lang, vice-president of the Hartford Rubber Works Co., died suddenly of heart trouble this afternoon at his home in this city. He arrived home this morning at 10 o'clock from a trip to Columbus, O., but did not complain of being ill. Mr. Lang was born in New York July 18, 1858. Twenty-five years ago he entered the employ of the West Shore railroad as foreman of machine shop, under the late Charles H. Dale, president of Hartford Rubber Works Co. at the time of his death. Mr. Lang next became assistant superintendent of the C., N. O. & T. P. railroad at Chattanooga, Tenn. From that road he went to Birmingham, Ala., where he was connected with the Great Southern railway. From Birmingham he went to Morgan & Wright and had charge or construction of their new plant. Two years ago he came to this city to be factory manager of Hartford Rubber Works Co. and in 1907 was promoted to be vice-president. He is survived by his wife. Mr. Lang was a thirty-second degree Mason. He belonged to the Knights Templar commandery in Detroit, Mich.

### THIRD DIVIDEND ORDERED

Hartford, Conn., Sept. 22—Special telegram—Vice-Chancellor Howell signed an order yesterday afternoon directing the receivers for the Pope Mfg. Co. to make such applications to the various jurisdictions in which the assets of the Pope company are situated as may be necessary for the purpose of securing the transfer of sufficient funds to enable them to pay a third dividend of 25 per cent on all approved claims. There was pending an order obtained by Percy S. Bryant, of Hartford, as counsel for a creditors' committee representing claims originally in excess of $1,000,000, directing receivers to show cause today why they should not be compelled to pay a third dividend. Vice-Chancellor Howell signed an order today barring certain creditors from appealing from the determination of receivers in disallowing their respective claims. This order was made pursuant to an order signed July 28, limiting the time of appeal.

# WIRE WHEELS VS RIMS

## Chicagoans Draw Comparisons Between Their Recent Test and the One in England

Chicago, Sept. 21—Since the Chicago Motor Club had the honor of being the first in the United States to promote a demountable rim contest, it naturally follows that there is considerable local interest being shown in the official report of the technical committee of the Royal Automobile Club on the time test of the Rudge-Whitworth detachable wire wheels, conducted at Brooklands July 21, the car used being a 38.6-horsepower six-cylinder Napier. Conclusions drawn by a comparison of the time made in the local demountable rim test with that made in the English affair lead one to believe that from a speed standpoint the demountable rim stacks up well with the wire wheel.

The Royal Automobile Club's technical committee reports as follows: "On the first eight changes all four wheels were changed. There were six men employed on these changes, one at each wheel and one at each jack. Jacks of special construction were employed, enabling one man to raise, unaided, one end of the car. During the ninth change two wheels, rear, only were changed, two men being employed, one at the wheels and one at the jack. The changes were as follows: First, :54⅘; second, :44⅘; third, :57⅘; fourth, :51; fifth, :52⅘; sixth, 3:25; seventh, :47⅘; eighth, 1:13⅘; ninth, 1:20. Subsequently to the fifth change the near right wheel came off when the car had been driven 60 yards. This was caused by the lock nut engaging, and therefore not screwing home. The cardboard disks which were fitted to the wheels put on in this change prevented the mechanic seeing through the holes, provided for the purpose, whether the wheel was home. The considerably longer time occupied in the ninth change was caused through the lock nut on the rear wheel refusing to start on its thread. This apparently was caused through the accident which happened subsequent to the fifth change."

It is impossible to make accurate comparisons between the English wheel trials and the American rim test for the reason that in the former there was one man to the wheel and one to the jack, while in the local affair the man who handled the jack turned to and assisted the man on the rim as soon as he had finished elevating the wheel from the ground. Still, the figures show there is not a vast amount of difference in point of speed. The English test occupied 74 seconds to the wheel and the American 74¼, the latter including five different cars. Again, it is not known if the English time included dropping the raised wheel to the ground and replacing the tools on the running board of the car as was the case in Chicago.

# MONTAUK RUN IS A MOTORING NOVELTY

START OF THE CARS FROM COLUMBUS CIRCLE IN NEW YORK CITY

NEW YORK, Sept. 21—Manhattan's dealers had an enjoyable 2 days' outing on Long Island on Wednesday and Thursday of last week, in which a considerable contingent of pleasure-seekers, regularly entered as tourists, or volunteering for official duty, participated. The excuse for the happily-conceived and well-received junket for the tradesmen and their friends and all comers was by name a "2-day mechanical efficiency motor car test and run around Long Island." It was the conception of W. J. Morgan, who, in the interim of newspaper work, finds time to discover Ormond, to get cars to climb to the clouds, to persuade motor boats to cross the gulf stream to the Bahamas, and to suggest unending stunts to motorists seeking for novelty and excitement.

The New York Automobile Trade Association saw a holiday ahead and readily consented to the event being run under its auspices. It duly appointed Morgan its manager and the latter set Alex Schwalbach to work at the details and framing up a set of rules that would afford an acceptable and not too strenuous schedule and set of rules that would not interfere too much with the holiday spirit of the affair. Schwalbach took an experienced tour manager and follower, R. H. Johnston, into consultation, and between the two they evolved an adequate set of rules. In brief, tardiness at controls lost a point per minute, and work on repairs, replacements, or adjustments a point per minute per man engaged, with no penalization for tire repairs.

Everything went off as merrily as a marriage bell. Everyone was so "delighted" and had such a "bully good time" that Morgan's latest stunt was unanimously voted well worthy of annual repetition as a scheduled autumn trade outing. While the selling fortune of no make could be said to have been made, it is equally true that no serious damage was done any brand of motor car by the outcome.

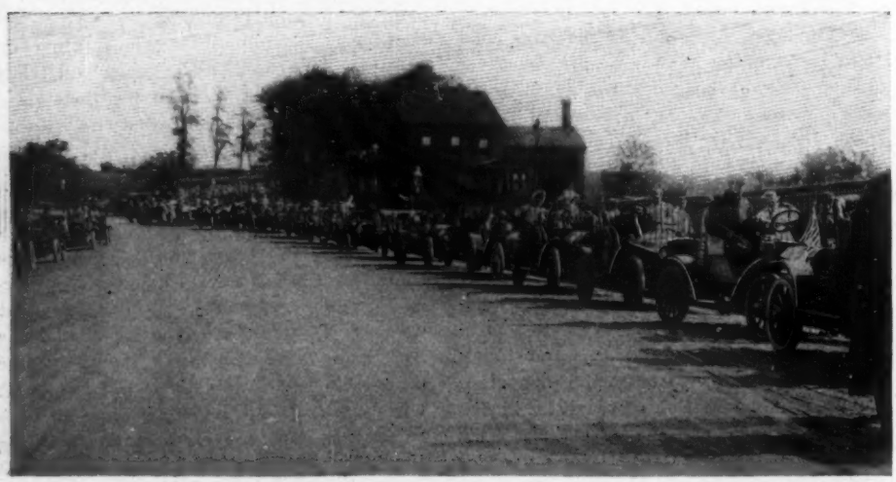
What more inviting trip could be offered a New Yorker at his very doorstep than a 2 days' jaunt around Long Island? There was enough cool autumn twang to the air to make the ride exhilarating. The first day's run was along the south shore after a pretty ride through Bay Ridge, Bensonhurst, Bath Beach, over the boulevard along New York bay. Then came the Merrick road, which further on becomes the South pike, running through fashionable Babylon, Bay Shore and Islip, to the Hamptons and the picturesque Shinnecock hills, with their quaint windmills and unique villas nestling on the sand dunes, and winds up at Amagansett. Break the run with a beefsteak dinner taken al fresco at Ye Anchorage inn at Blue Point and one can ask for no prettier day's jaunt.

It would not have been Morganesque, however, to have furnished no spicier touring menu than such a peaches and cream jaunt over level macadams and smooth gravel highways as the run from Brooklyn bridge to Amagansett. From this point as a piece de resistance he had prepared a road tussle over a practically untraveled stretch of wild country to the eastern end of Long Island, where the Montauk Point light casts its ray over the conflux of sound and ocean. It was an almost pathless run for 13 miles, at times through deep sand, at all times through some sand, and at some times with pretty steep grades up the dunes and larger hills added. Troubles soon began and before the night was over in some cases they had developed into real adventures.

It was well on toward sunset when the caravan entered the desert with schedules varying from 50 minutes for the large to 59 minutes for the small cars for the run. The Amagansett turnpike had not been left many miles behind before cars began to be stalled and in turn to stall others following imprudently close behind them. It was a case of keep behind one another, for it was no easy task to pull out of the rut and run around. It was soon realized that time was short and then hurry was the order of the day. Fair passengers got a merciless jolting and masculine live freight got a pretty bad shaking up. To add to the schedule-making difficulty in such a waste there were few landmarks and cars went astray following the wrong trails. So it was that only about half of the cars got through on schedule and a majority of them made it with the narrowest kind of margins.

Two cars met with casualties in the battle through the sand that put them out of the run. H. M. Casbrunt's Lozier broke its differential in a rut and incidentally stripped its gears in endeavoring to extricate itself. A farmer was fortunately found to tow the car to Amagansett. A Stoddard-Dayton, piloted by R. L. Newton, was less fortunate. It broke a wheel and had to be abandoned until the arrival of a new wheel the next day. It had two women aboard. R. M. Owen insisted on starting back at 10 o'clock in the Reo to rescue the stranded ones, but missed them in the dark. In the meantime they had to walk to Montauk inn. They followed the railroad tracks some of the way and and reached the inn at midnight. Belated and lost cars straggled in all during the evening and night.

At a meeting of the committee to con-



LONG LINE OF CONTESTANTS AT CHECKING STATION AT BAY RIDGE

sider the cause of the delayed cars, it was leniently and diplomatically decided by Morgan and his advisers to call off the sand battle altogether and make Amagansett the end of the first day's control.

The early arrivals pre-empted all the rooms at the inn not set apart for the women. The others to the number of close to 150 were forced to find their way as best they could to the steamer Shinnecock, which was moored at the dock.

The caravan got away from Columbus circle at 7:20 a. m. on Wednesday, proceeded down Broadway, across Brooklyn bridge, and along the Bay boulevard to the Crescent Athletic Club at Bay Ridge, where they checked out and were sent on their journey by Fred J. Wagner. The cars were classified as follows: Class A, cars selling for $850 or less; class B, cars selling for $851 to $1,250; class C, cars selling for $1,251 to $2,000; class D, cars selling for $2,001 to $3,000; class E, cars selling for $3,001 to $4,000; class F, cars selling for $4,001 and over; class G, taxicabs carrying two passengers and driver. The participants in the run were twenty-eight contestants and eight tourists, besides a half dozen official cars, making some forty-two cars in all. They were:

| Class | Make | Driver |
|---|---|---|
| A | Cadillac | E. H. Brandt |
| A | Maxwell | F. O. Hinhauser |
| A | Reo | J. W. Gogarn |
| A | Ford | Frank Dunnell |
| A | Brush | W. W. Price |
| B | Reo | R. M. Owen |
| C | Maxwell | C. W. Kelsey |
| C | Mitchell | O. R. De Lamater |
| C | Mitchell | W. D. Brown |
| C | Chalmers-Detroit | William Knipper |
| D | Mitchell | C. A. Kirchhof |
| D | Apperson | Sidney B. Bowman |
| D | Oldsmobile | F. G. Falberth |
| D | Stoddard-Dayton | A. H. Whiting |
| D | Pullman | Paul Cimiotti |
| E | Mora | W. W. Burke |
| E | White | Charles Lowd |
| E | Stevens-Duryea | Carl Reichenbach |
| E | Stevens-Duryea | Frank Eveland |
| E | Stevens-Duryea | L. Young |
| E | Lancia | C. H. Tangemann |
| E | Locomotive | P. J. Johnson |
| F | Rainier | Mrs. Joan N. Cuneo |
| F | Rainier | L. A. Disbrow |
| F | Zust | V. P. Pisani |
| F | Acme | J. W. Mears |
| F | Lozier | C. A. Emise |
| F | Locomotive | H. C. Townsend |
| | TOURING DIVISION | |
| C | Maxwell | Mrs. J. R. Ramsey |
| C | Autocar | Frank A. Burrelle |
| D | Haynes | W. E. Shuttleworth |
| D | Oldsmobile | W. J. Wyatt |
| D | Stoddard-Dayton | R. Newton |
| F | Stevens-Duryea | C. M. Louther |
| F | Lozier | H. M. Casbrunt |
| Special | Lancia | Harry Fosdick |

The first day's run was 144.4 miles from Brooklyn bridge to Montauk. The checking stations were at Lynbrook, 34.5 miles; Blue Point, 73 miles; Southampton, 115.2 miles; Amagansett, 131.6 miles, and Mauntauk inn, 144.4 miles. The schedule called for 19 miles an hour for cars over $2,000, and 17 miles for cars under that price all the way to Amagansett, and for 15 and 13 miles for the 13-mile sand battle.

The start on the second day was made sharp at 7:30 a. m. It began with a run of 6.5 miles to Montauk lighthouse, which raised the distance of the run back to Amagansett to 25.8 miles. The Stevens-Duryea big six burned out its clutch in the run to the lighthouse.

Wednesday's route was retraced as far as Good Ground, 49.8 miles. It here turned north to Riverhead. There the Suffolk county fair was visited, and the track was circled three times. The next checking point was Stony Brook. The run then followed the north shore, whose hills gave the cars a bit of a hill-climbing tryout, with a checking station at Oyster Bay. The last checking station was at Flushing, 154.5 miles. From this point the cars ran as they pleased, via Astoria ferry, to the Automobile Club of America clubhouse, a distance of 9.4 miles, having run 315 miles in the 2 days.

VISIT IS PAID TO A COUNTY FAIR AND CARS PARADE ON TRACK

### Results of the Test

New York, Sept. 23—Special telegram—Results of the Montauk Point run were announced yesterday by the contest committee. In the contesting division the following cars received clean scores, both mechanical and in the time schedule, and first-class certificates and medals will be awarded to the drivers: No. 1, Cadillac; No. 3, Maxwell; No. 5, Mora; No. 6, Reo; No. 7, Rainier; No. 8, Rainier; No. 9, Mitchell; No. 10, Apperson; No. 11, Reo; No. 12, White; No. 14. Chalmers-Detroit; No. 15, Oldsmobile; No. 20, Zust; No. 21, Acme; No. 22, Ford; No. 25, Stevens-Duryea; No. 29, Stevens-Duryea; No. 30, American Locomotive; No. 31, Stoddard Dayton; No. 35, Mitchell, and No. 40, Pullman.

In the touring division the following cars were marked for clean time schedules, and the winning drivers will receive medals for their performances: No. 2, Haynes; No. 16, Oldsmobile; No: 36, Maxwell; No. 13, Lancia; No. 41, F. H. motorcycle, special mention for arriving at Montauk on the first day on time.

In the contesting division No. 4, Maxwell, was disqualified for taking the wrong road from Montauk Point lighthouse back to Montauk on the second day, which really added 3 more miles to its running score. The Maxwell, however, made a perfect score otherwise during the 2 days, both mechanically and on the time schedule. No 18, Stevens-Duryea, was penalized 105 points for ignition troubles. Mitchell, No. 26, was penalized 125 points, an oil-feed pipe having become clogged, which caused some trouble with the connecting rod bearings. No. 39, a Lozier, was disqualified and its driver was disbarred from competing in future events under the auspices of the association for leaving the noon control at Blue Point without checking out.

VIEW TAKEN FROM LIGHTHOUSE ON MONTAUK POINT

# MODERN STATE ROADS IN CONNECTICUT

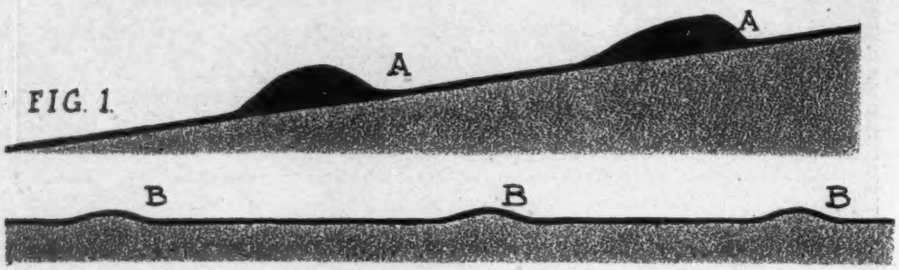


FIG. 1.

ROAD WITH WATER BREAKS A AND WARTS B

**EDITOR'S NOTE—This is Part II of an address delivered by James H. MacDonald, Highway Commissioner, State of Connecticut, at Good Roads and Legislative Convention of American Automobile Association, Convention Hall, Buffalo, N. Y., July 7 and 8, 1908.**

I HAVE a few suggestions in road building that perhaps I might indicate. There was a question with me whether I should take up the matter of technical construction in a practical way. But I will record briefly the methods employed in my own state. You all know that conditions change in every state; conditions change in towns. So that I do not lay this method down as the standard construction, but only as what I am doing in the state of Connecticut. You perhaps might have had an idea that I was building a splendid system of macadam roads, and that anything I might say here would be practically valueless to towns which had not inaugurated a macadam system. We build all kinds of roads, and some of the best roads in the state of Connecticut have not as yet had a stone put on them—simply drained, grades reduced and all unnecessary curves taken out, or modified.

In Fig. 1 grade breaks are very plainly indicated by black marks A, which appear on the white ground. I have never been in favor of these unnecessary adornments — thank-ye-ma'ams—on your roads, and have never built one. In fact, I never will build one. If the grade indicated on this chart, in its natural run, is 7 per cent, when the poor old horse comes up to the point where there is one of these thank-ye ma'am, the fact of its being there is very liable to increase that grade from 7 per cent to perhaps 20 per cent. So I have described these unnatural monstronsities on our roads as "graves for horses." They are of no use. There is only one way to lay a thank-ye-ma'am, or grade break, on any road, and that is lengthwise with the road.

You will notice on this chart, just below the thank-ye-ma'am, there is a line drawn showing little mounds B at frequent intervals. I call them Indian mounds. I have seen miles of roads with these little upheavals on them, and I have christened them ripples. On many of our roads I have found about as many of these ripples as there are in the ordinary politician's conscience. Now, the natural inquiry will be, How do these occur? Now, this is practical road building. These occur through those persons repairing the road dumping a load of gravel in a mud hole either from between the reaches of the wagon, or, if a dump cart is used, from the end of the cart. After the load has been dumped into the hole the men proceed to knock the head off that little pile of gravel that has fallen on the road. In other words, they scatter all of that gravel that is above what they consider the proper grade of the road, on all sides of that part of the road that is outside of the load that has been dumped, with the result that where the entire load fell from between the reaches of the wagon or from the end of the cart, that particular part of the load offered resistance to travel, while that which was cast on to the road with a shovel yielded to travel. If that particular road were to remain undisturbed for 100 years that wart would still remain on the road, whereas if, on the contrary, they had deposited that load of gravel, or dirt, to one side of the road and had then spread it uniformly over the road, they would have had a smooth repair and some return for the money and time expended. I have named these wart roads, and I am trying to get rid of them.

FIG. 3A

EMBANKMENT G, SHOULDER F AND TRAVELING PATH E

In Fig. 2 is clearly indicated a road any intelligent man can remember having gone over. The chart shows an elevation at the center C of the road with quickly depressed sides D, with a wagon on the center of the road and another at a very acute angle. This is a hog-back road. You have either got to stay in the center of such a road or fall into the ditch. Now, it does not making any difference if you were to expend $100,000 in building that road, you will never receive even a fair return for the cost. Its use to the traveling public is practically confined to the width of the wagon tires. If they are 4 inches wide the two tires would make 8 inches of road, and for that you have paid $10,000, $15,000 or $20,000; whereas, if the road had been built with a proper cross slope grade, say not to exceed ¾ inch to the foot, every inch of that road would be available for the travel, by reason of the fact that with the lighter cross slope grade—that is the grade from the center of the road to the shoulder—every foot of that road would be an invitation to travel, which would thereby be distributed over the entire area, thereby extending the life of the road. The hog-back road, in point of usefulness, is the most expensive road any town can build, and there is no earthly reason for the construction of a road on that plan. No road should ever be built whose cross slope grade would not offer pleasant and safe access, at any time, from the center of the road to the ditch, and a safe return back from the ditch to the center of the road, in case passing teams make it necessary to turn out.

Fig. 3 shows the different features and component parts in the construction of a road—the travel path E, the shoulder F—which is the support to the material of which the travel path is contsructed—and the embankments G. The building of the shoulder F to the road is as important to that road as is the surface E upon which you ride. In building a new shoulder to the height required to establish the grade it is necessary, in putting in the material, to have it up to and even with the grade line established. When this newly added material is put on it should be thoroughly compacted, and it should not, in placing

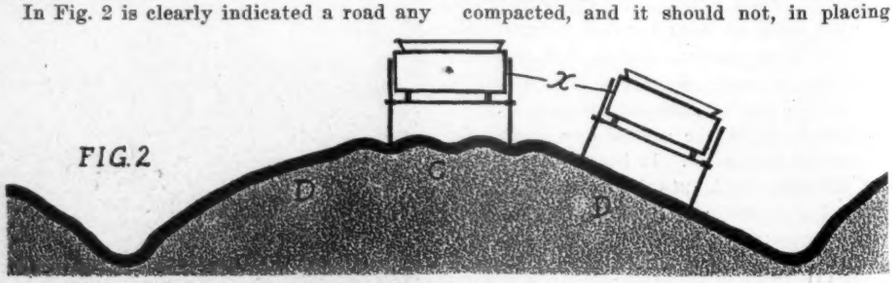
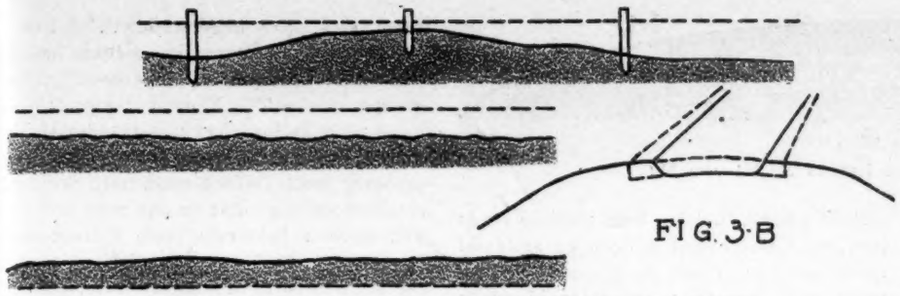


FIG. 2

THE HOG BACK ROAD AND ITS VILE CONTOUR




PERSPECTIVES AND ELEVATIONS OF ROAD SHOULDERS AND CONTOUR

the material with which to construct it, be run flush with the lines that have been laid down for the grade and width. On the contrary, it should be extended into the travel path and thoroughly rammed so that it will be solid and unyielding, after which the material should be cut back to the line established for the shoulder. It should never be finished flush with new material, because it is almost impossible to run a crown on that road you are constructing unless you have a good, firm and unyielding shoulder to work to, by reason of the fact that you cannot hold the crown, while in process of rolling unless the necessary support is given by the shoulders. The character of the material used in the travel path—whether of cinders, gravel or stone — makes no difference. If you desire a good, substantial road you will have to build the shoulders in that way. This is a very important matter in building roads, and yet is one very little thought of by the ordinary road builder. They simply widen out the road, scoop out the ditch and do not properly shape or compact the shoulder to carry the material in the travel path.

Fig. 4 illustrates the slopes in the cut and in the fill. You will notice the dotted line H which runs from the gutter line up through both in the cut and in the fill is built on a basis of what we call the angle of repose. That is, the angle at which the slope will naturally rest, if properly constructed. The dark lines K show the improper slope both in the cut and in the fill. In the cut, where a slope is made too abrupt, the overhanging weight causes the slope to break down, and the earth, by reason of that fact, falls down into the gutter. This material will have to be removed in the spring. In the meantime, the water not having free course in the natural gutter line, has a tendency to go over the road proper and cut that road up. In the fill, the tendency will be, where a slope is not made properly, that the edge of the embankment will break, and with the rain falling on this improperly constructed embankment, the slope gradually yields and the elements finally eat into the road, which not only makes a danger point, but also has a tendency to destroy the road. Too much importance cannot be attached to this important function in road building.

Fig. 5 illustrates a road excavated ready to receive the material, the shoulder F and the gutter being properly constructed and shaped. This phase of the work is now ready to receive the material that is to be put in the travel path of the road. For drainage and also for the support of the road the subgrade L—that foundation upon which the wearing surface is supported—should be identical with the cross slope grade LI of the road when completed. That is, the subgrade, when completed, should have the same contour as the road when it is finished and ready for travel. I do not believe in thin-edged roads, with an increased depth at the center. I consider it a great deal better to have a uniform depth of material over the entire travel path of the road. The other method may result in a little saving of material, but any advantage in that direction is lost in the end in not offering a proper sustainment at the shoulder for the center, or crown, of the road.

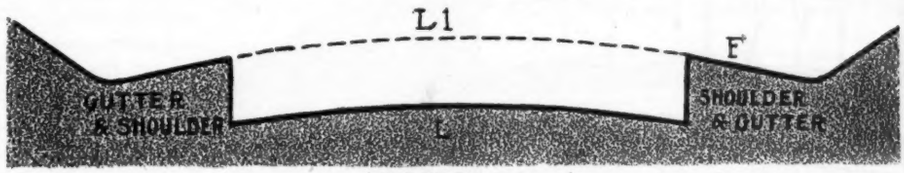


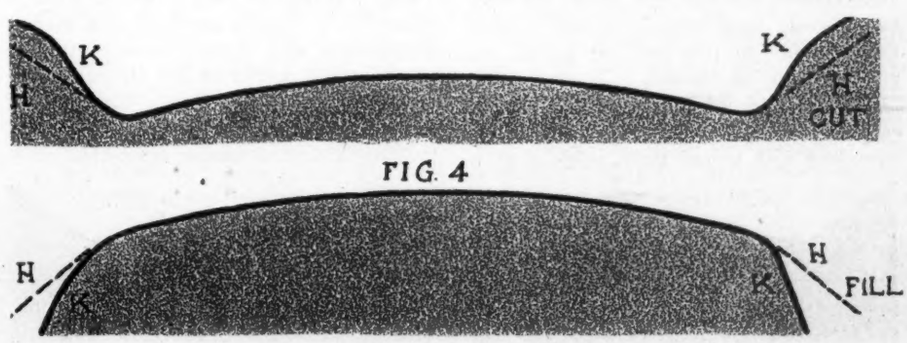

FIG 5.

SUBGRADE L WITH PROPER CURVE FOR ROAD FOUNDATION

Fig. 6 shows a macadam road. After we have shaped the road properly, as indicated, we are now ready to put in whatever material we desire to have in the travel path. You will notice, on this illustration, that I am building my macadam roads in three courses. I prefer this method by reason of the fact I think it is a great deal better to construct my road in courses rather than to put the entire depth of stone all in one course. In adopting this method I use mixed stone in preference to stone of uniform cubes. The first course M is what we call No. 1 stone, simply for distinction, although it is composed of stone ranging in size from ¾ to 2 inches. A sufficient amount of this stone is put in, so that after rolling it will be 4 inches in depth. If I had my jars here, for the purpose of making an illustration of the difference between uniform cubes and mixed stone, I could show you that you can take a 2-gallon jar of water and another 2-gallon jar filled with 2-inch stone—uniform cubes—and that very nearly, if not all, of that water could be put into the jar containing the stone, the voids taking up that water. So, the natural conclusion is that when you build a road in that way you are paying for air, with the result that when the No. 2 stone —the second course MI—is worn off, all you will have received as a return for your money expended in the construction of the road are the 2 inches and the 1 inch of screenings which are put on the top of the road for bond, or wearing surface, and you will have paid for 7 inches. The reason for this is that the entire lower course M, which is the first course, will speedily find its way to the surface of the road and you will have a very loose and unpleasant construction to travel over. So I find it is better to build your road from the bottom to the top with ¾-inch stone mixed with the larger size, finishing with the screenings.

When John McAdam built his roads he did not have anything in the way of a steam roller or a stone crusher. He had the stone and when it was fractured it is reasonable to suppose there were some small-sized stone. History does not relate that he threw them away, and when he said no stone larger than what could be put in a man's mouth should be used he meant 2-inch stone.

And so I build that first course M with ¾-inch to 2-inch stone, making a solid and compact base at the subgrade. Then I continue the mixed stone in my second




BANK SLOPES K AND ANGLE OF REPOSE OF ROADS

FIG 6

MACADAM ROAD WITH THREE LAYERS M, M1 AND M2

course MI, using stone ranging in size from 1 inch to 1½ inch, putting on a sufficient amount to roll down to 2 inches. After the roller marks and foot marks have been taken out I then bond the road with screenings M2. I require, in the application of these screenings, that they shall not all be put on at once, but shall be applied gradually—a little at a time—the first application being dry; then roll the road, after which I commence to use the sprinkling cart; then more screenings, followed by sprinkling and rolling. And so I continue to apply the screenings, sprinkling wagon and roller until the road will shed water and not absorb it. A road that will not shed water, you can be reasonably sure, will go to pieces, because the voids have not been filled up, nor has the road been properly compacted. There is only one way to apply screenings in finishing a road, and that is to do just exactly the same as you would if you were going to paint a carriage body. You would put on a coat of paint and rub it in; then a little more paint and rub it in, and continue that process and then you would have something that will not crawl upon which to put the varnish. So it is with the application of the screenings top, or finishing course, of the road. At least this process has proven itself in my work. The old method of putting the inch of screenings all down in one course, wetting and then rolling, will never result in a hard finished surface—and unless the road has a good, hard surface, it will respond very speedily to ruts and toe marks, imprinted upon its surface.

The character of the stone used in the construction makes a great difference. We have trap rock in our state, taken from a certain quarry, that has been used on roads that have never had a drop of artificial water since the roads were constructed 10 years ago, and they are splendid roads today. Then we have other roads, on which the stone used were taken from trap dykes, covered with dirt, and these roads have gone to pieces in 2 years. The stone used in the construction was smooth and had the corners broken off, or worked through the crusher, and the contractor took advantage of his specifications and put them in. Today I find the stone are working up through to the top of the road; but a road well built under a good specification and with proper stone of right quality I find does not need a great deal of artificial preservative to keep it in order. Such roads want a little attention and at the proper time. The trouble is we wait too long. The horse is stolen before we lock the barn. I am afraid that before we get through with road building in this country we will have to follow the same custom that has been established for many years on the other side, which is to divide the road into sections; put a man on every section to take care of that particular road, keep him there and pay him for the work, and make it his duty and obligation to see that his section is kept in repair. That is the only way we are ever going to keep our roads in condition for the horse and motor traffic and this point should be remembered.

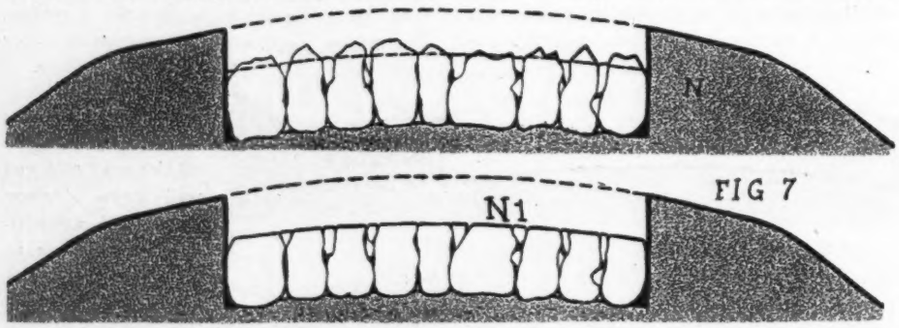



FIG 7

TELFORD ROADS IN ROUGH STAGE AND READY FOR MACADAM

Fig. 7 brings to your attention what is known as a Telford road—a road that is constructed with a stone base. It is a very difficult matter to get contractors or town officials to construct a Telford road properly. Many times they say to me, "Commissioner, I cannot build that road. I do not quite understand it." I say, "Can you build a good stone fence around the farm? Did you ever see one?" They answer, "Yes." Then I reply, "Well, build your Telford just like that—just like a well-built stone fence, and that is a properly built Telford road, only lay your stone fence down flat on the road and you will have a perfectly built Telford construction." In building a Telford road I use stone 6 to 10 inches in width, 8 to 18 inches in length, and 8 inches deep, placed by hand, broadest surface of the depth of the stone placed down, and stones laid in courses N across the road at right angles to the center line of the road, and all stones set up vertically; all joints broken and all interstices chinked in and wedged with broken stone. All sharp points of stone must be broken off with a hammer to bring the surface of the bed stone true to grade, as at line N1. The bed stone should be laid up full and strong, so as to allow for all settling in rolling. In no case will the contractor be allowed to use stone that is not up to all these requirements. After the bed stone has been laid, chinked in and broken off to grade, the roller shall be run over the bed stone until it is firmly bedded and will not kick or rock under the roller. No nests of small stone are allowed, nor is the contractor allowed to use rotten stone in making use of the Telford construction.

Not a single one of these points in construction should be omitted. There is nothing that makes so much trouble as a rough or unevenly built surface to a Telford road, for the uneven surface is sure to work up through the macadam and furnish an unpleasant surface to ride over. When the Telford is properly constructed, even if the 5 inches of macadam is worn down, you will still have a good road to travel over, and there never was a Telford road, if properly built, but what gave good satisfaction. My investigations have demonstrated this to me more than once.

I build Telford only in swale places where there are spring holes. I never lay a Telford road in any but swale places for the reason that although a Telford road is 13 inches in depth it will not wear as well as a macadam road—insofar as the macadam construction is concerned—7 inches deep. The reason of this is simply that the point of contact is so near the point of resistance. The Telford road is rigid and there is resistance on the bed stone, and where there is resistance there is friction; where there is friction there is increased wear. So that a 13-inch Telford road will not wear the same, or give as good a return for the money as a 7-inch macadam road. There is resiliency and yielding in a macadam road, while there is resistance in a Telford road. It is a clear case of the hammer and the anvil. But we put these roads down where we encounter wet, swale places to assist the road and we find that the idea is a good one.

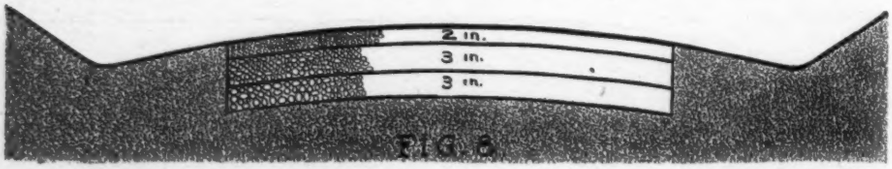



FIG 8

GRAVEL ROADS BUILT IN THREE LAYERS

Fig. 8 shows a road construction I build in the state of Connecticut as a gravel road. This illustration shows that the gravel is 8 inches in depth. The great trouble in building gravel roads is the difficulty in securing good gravel, and also the lack of ability on the part of the town officials to properly select the kind of gravel that will wear well and not become loose when put on the road. I am often asked, "How do you know when gravel is good? How do you tell?" When you find any gravel that requires a pick to dislodge it from the bank you may be reasonably sure that such gravel will make a good wearing surface. In the construction of these gravel roads I put the gravel in in three courses, 1, 2 and 3, because I want the roller pressure there. After I have rolled the subgrade upon which the gravel is to be placed so that it is firm and uniform, I proceed to build course 3, which consists of stone ranging in size from 1 to 3 inches, longest diameter of the stone. I use in this course 80 per cent gravel—that is eight parts of gravel—and 20 per cent bond. By bond I mean material that is inherently in the gravel to assemble the stone. I require this stone to be put in 3 inches in depth, after the rolling has been completed. After all foot and wheel marks have been taken out I then apply course 2, which is of the same depth, after rolling, as the first course—3 inches. The character of the gravel is just the same as that in the first course—80 per cent gravel and 20 per cent bond. I change the dimensions of the stone, however, to those ranging in size from 1 to 2 inches, longest diameter. As we get nearer to the top of the finished road I do not care to put in as large stone as in the base, or bottom course. This bottom course should be the foundation or footing course to sustain the carrying power of the road. After this second course has been put in and firmly rolled I apply the last course I of gravel. The amount used in this course must be sufficient to roll down to 2 inches. I change the dimensions of the stone, so that no stone in this course shall exceed 1 inch, longest diameter, and the percentage of stone and bond is also changed, so that the gravel in this course is 60 per cent and the bond, or assembling power, 40 per cent. In this construction you will notice I use just about the same method the Lord did when he built this little crust upon which we live. He built his stone foundation below, and if you will notice the stratification you will find that as He reaches the surface He cements it all with the subsoil, and then on top the loam. In my judgment as highway commissioner it is a good system to follow in the construction of a gravel road.

Fig. 9 shows also a gravel road. That, perhaps, will answer a question that you are turning over in your mind, which is that many of you may say you cannot afford a roller, or to build a road of the

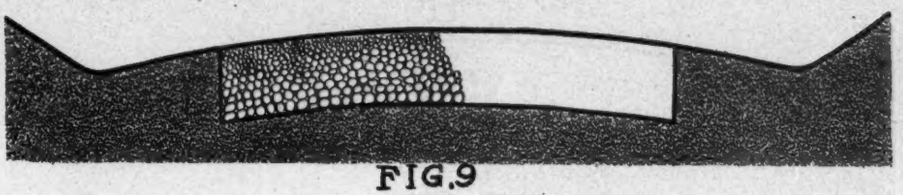


FIG.9

GRAVEL ROAD BUILT IN ONE LAYER

kind I have just treated. So to meet just such conditions—and we have them in our state—we build this other kind of gravel road. In other words, we try to build roads to suit the pocketbook of the town and the conditions we have to contend with in the way of material. In this construction we apply the gravel all in one course, but we are always sure that the gravel is dumped on one side of the road and then the whole road covered uniformly. Then we rake down the coarse gravel found in the gravel down to the base, or subgrade. After that we true the road up and turn it over to the travel, letting such travel be its own roller. At the same time we pursue the usual practice of building the slopes in the cuts and in the fills. We build the shoulder, we build the subgrade, and we do everything just the same as we would in the most expensive construction. This character of road is giving splendid satisfaction and takes care of the travel that that particular district has. So you will see we are building roads other than macadam in the United States of America.

Fig. 10 shows a gravel road with a Telford base N. The Telford construction is just the same as that used in the macadam road. The only difference in the two kinds of construction is that gravel is used in the place of crushed stone. This makes a splendid road, and if I had enough good gravel in the state, I want to tell you here and now, I would never lay another inch of macadam in the entire state. It is a mistaken idea that we cannot make splendid gravel roads. We can do it. We have miles of gravel road in the state and we wouldn't swap them today for any macadam section we have. The west has got to meet that question of material. We simply have to take the conditions as we find them and utilize them. The man who goes into the position of highway commissioner will have to take these conditions and make the best of them, if he is going to act up to his best official privilege. He must meet those conditions and not have any hobby to ride to death. It is the people's money he is spending, and he should spend it righteously, economically and intelligently. In many of our towns, especially within borough lines, where I lay roads, I find it necessary to instal a cobble gutter P, and Fig. 11 shows how that construction is laid. This cobble gutter is what we call the double rim edge—that is, cobbles, or stones, set with the depth of the stone down and at an angle of about one-to-one, which is 1 foot vertical rise to 1 foot horizontal. The ordinary curb that is used will cost from 35 to 40 cents a foot. This cobble gutter construction can be laid for about 50 cents a yard—just about one-third what it would cost for the curb. Cobble gutters not only serve to make a gutter line to carry the water, but where laid in this way they result in forming a curb which will make a sustainment for the walk, if it is desired to build one. The water is held back from the sidewalk and is carried down to the nearest exit point, making a splendid improvement and a cheap, but substantial, curb. I have laid a great many miles of this character of cobble gutter and find it keeps its shape and does splendid service. It certainly is an economical way of treating this phase of the question that is presented to commissioners many times in their work and is one well worthy of consideration by all those interested in the construction of roads.

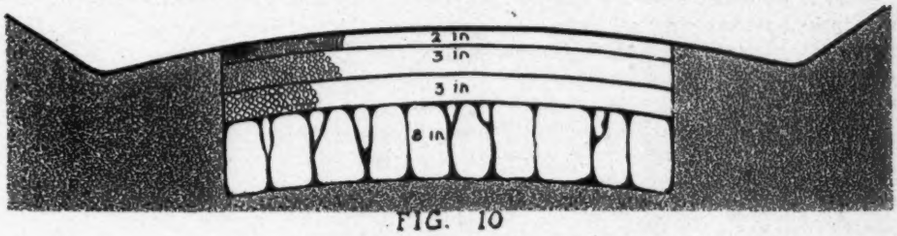



FIG. 10

COMBINATION TELFORD AND THREE-LAYER GRAVEL ROAD

Something should be said about drainage. Fig. 12 is in reference to this very important matter in road building. There are three great principles in road building, under the head of drainage. The first is, get the water out of the road; the second, get the water off the road; the

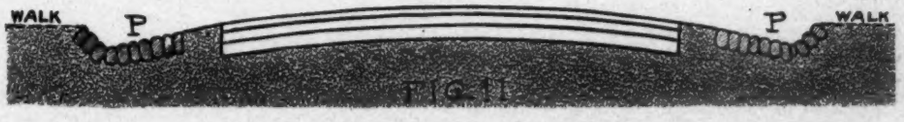
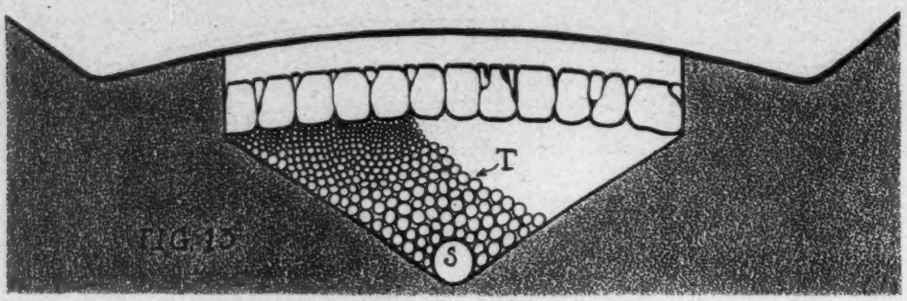



FIG. 11

WALK, GUTTER P AND TRAVEL PATH RELATION



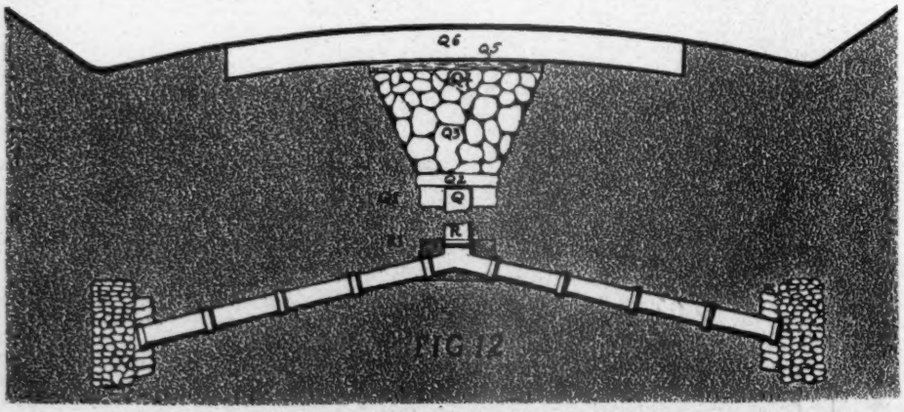

SPECIAL ROAD DRAWING IN LOW GROUNDS

third, get the water away from the road. If you follow those things you will have accomplished the whole science of properly draining a road. Many times in my work I find that a Telford construction will not take care of a bad, low-lying, wet section of highway—and I have quite a number of such in my state. In the early days in New England there was organized what was known as the proprietors' committee. They selected and arranged for the layout of roads and adjusted differences. Once in a while—just the same as at the present time—the proprietors' committee had a friend whom they desired to serve. In serving this friend it must have occurred, many times, that the friend had a piece of land that the committee desired to construct a road over, and they saw to it that that piece of low-lying, wet land that their friend had was swapped for a good piece of high and dry, sweet and clean upland, with the result that with this arrangement we find it has added to our official duties and considerable expense to the state in bringing such sections of highway up to a high and dry condition for travel without having to resort to a boat. In such places, where these low, wet places occur on the roads, I use this underdrainage. I do not find anything that has worked out so successfully in furnishing a complete and first class system of underdrainage as this rubble drain construction, which I have just been discussing with you.

In this construction an excavation Q 3 feet in width at the top and 3 feet, 3 inches deep, and 18 inches wide at the bottom is made in the center of the road. The top width is measured from the center line so that 1 foot, 6 inches will be the width of the ditch from either side of the center line. The sides of the ditch are faced down uniformly and smoothly to the bottom so that an unbroken side will act as a sustainment for the walls of the ditch. After the ditch has been excavated to the dimensions specified, we provide that the contractor shall lay an edge of stone Q1 on each side of the bottom of the ditch, this edge to be from 6 to 8 inches in width and 6 inches in height, thus leaving an open drain Q2 6 inches in width and parallel with the line of the construction of the ditch, except that at the end of the drain, where the pipe is to be inserted, it shall be 8 inches in width. The inner face of both these rim edges must be true and smooth so as to offer no obstruction to the flow of the water. Upon the top of these rim edges is placed a covering stone Q3 not less than 3 inches in thickness, with the entire rim edges so covered as to protect the under drain. Upon the top of the covering stone is placed field stone Q4, fence stone, or cobble stone not to exceed 6 inches in their longest diameter. The depth of this size stone does not exceed 18 inches from the top of this underdrain to the top of this course of stone. Upon the top of this 18-inch course of stone is placed another course of stone Q5 ranging in size from 1 to 3 inches in its longest diameter, which course is 8 inches in depth. On top of this 8-inch course, when the stone has been brought up to within 12 inches of the top of the road, is placed a covering of inverted sod Q6 or hay, put on for the purpose of protecting in a thoroughly perfect manner the filterage purposes of the stone, so that the possibility of any earth finding its way down into the rubble work will be entirely removed. A 2-inch course of sand or gravel is then laid on top of this inverted sod, or hay, bringing the level of the ditch up even with the subgrade. This course of sand, or gravel, is thoroughly compacted. The material used in the construction of the road is then laid on top of this sand or gravel. At the end of the drain is placed an 8-inch salt glazed, vitrified tile pipe R, which is laid to the exit point for the water. The end of the pipe where the connection is made with the underdrain is laid up in a cement bed R1 and the joints are thoroughly cemented so that all water shall leak into the pipe and none shall percolate through the soil. At the exit end of the pipe a cement header is built and a pipe and distributing apron is extended out 18 inches. I find this rubble drain, in its construction, is very inexpensive, and in its durability, I have never had to replace one since I took up the work of highway commission of the state of Connecticut.

In our state there are miles of stone fences that have served their day. They were first called upon to do service when the farmers, in cleaning up their land to grow their crops on, used them to protect their land while crops were growing. Now, then, as a natural sequence, the land having first been cleared, making it possible to grow crops, and, second, fencing in the growing crops, in these days of light and airy wire fences, the stone can be put to better use, which is to be placed in the road to furnish a proper sustainment and drainage to carry the crops that have been grown on the land by the farming population of the country to the nearest market place.

Fig. 13 shows another system of underdrainage which is used where we find very wet places, but can secure no way to discharge the water that falls into the bottom of the drain if we were to carry it to the same depth as that which is required for the rubble drain—that is, where the leak out, or exit point, is not low enough to carry the water away from the road. So, in this instance, I simply shape the ditch like a "V," put my drain pipes in the center and at the bottom of the excavation and fill the ditch with gravel T, leaking the water out at some convenient exit point, and then put the Telford on top. This construction not only furnishes a splendid foundation upon which to place the wearing surface, whatever it may be, but also ensures a good, dry road at all seasons of the year. These are all simple remedies. I have not the time to take up the whole question of how to properly make fills, nor the different kinds of culverts and other things in road building, but from these few crude ideas, hurriedly presented, you may gather something that will be of service to you in your work of building the proper kind of highways for the use of the people who travel the roads in the United States.




CENTER DRAIN S FOR LOW GROUND ROAD CONSTRUCTION

# The Baveruy Carbureter System Explained

M. A. LAURET, a European carbureter experimenter, in his recent researches, has made use of a double jet carbureter illustrated in Figs. 1 and 2. The theory of this carbureter was explained before the Academy of Science in Paris, France, June 22, 1908, by E. H. Armagat, and in brief is as follows: Since the adoption of the spray carburation, a defect inherent to its principle was manifest. A jet of gasoline injected in a canalization of drawn air does not always give a mixture where the ratio of gasoline and air is uniform at all speeds of the motor, the increased vacuum created around the spraying nozzle at high speeds being responsible for an excess of fuel and therefore far too rich a mixture. An auxiliary intake of air, operated by the driver, had to be provided to secure perfect carburation. For the first time in 1903 Krebs tried to secure the uniformity of the mixture at all speeds by an automatic air valve depending on the suction of the motor. On the principle that once the proper mixture for the minimum suction of the motor on the carbureter is obtained, it is easy to draw all the supplementary air needed at high speeds by means of an automatic air inlet operated by the very suction. This principle has been adopted and up to the present day is used on every modern carbureter; but, even so, it is difficult to obtain uniform mixture at widely differing speeds for several reasons, the principal being that the suction of the piston is not absolutely continuous, therefore, the vacuum created around the spraying nozzle varies and the flow of gasoline in the mixing chamber is not always in proportion with the incoming air, but rather in excess at high speed. This gives a poor mixture at low speed and too rich at high; but if, besides the original spraying nozzle, there is an additional one feeding not directly from the float chamber, but indirectly through an open air pipe, the flow of gasoline through this additional spraying nozzle will be in inverse ratio to the speed of the motor. At slow speed more gasoline will flow in the mixing chamber, and less at high speed, thus compensating the overflow which actually takes place at high speeds.

In Fig. 1 is shown the ordinary spraying nozzle G feeding directly from the float chamber F, and next to it the compensating nozzle H feeding through an open air pipe J, by means of another nozzle I, which is of larger diameter than H. This difference in diameter produces the uniformity in mixture by allowing a greater amount of gasoline at slow speed and a lesser one at high. It is this principle that the makers of the Zenith carbureter have adopted. Fig. 2, both nozzles G and H, are concentric, terminating at S, the ordinary nozzle encircled in the compensating which is annular. G feeds through the air pipe J, which is fed by an adjustable needle valve I. Inside the air tube J, which is open, is a small pipe O which leads to the opening U just below the throttle valve P. When the motor is not working the gasoline in the air pipe comes to the level of the gasoline in the float chamber. In cranking the motor it is drawn through tube O, through opening U, sprays against the valve P and starts the engine without the necessity of flooding the carbureter. The adjustment of both the nozzles G and H is perfect at all speeds, if H is regulated at say 1,500 revolutions and G at 250, which is considered the average maximum and minimum of the ordinary gasoline motor. It can be adjusted for any engine if this rule is followed, namely, the ordinary nozzle H at the highest speed of the motor and the additional one G at the lowest.

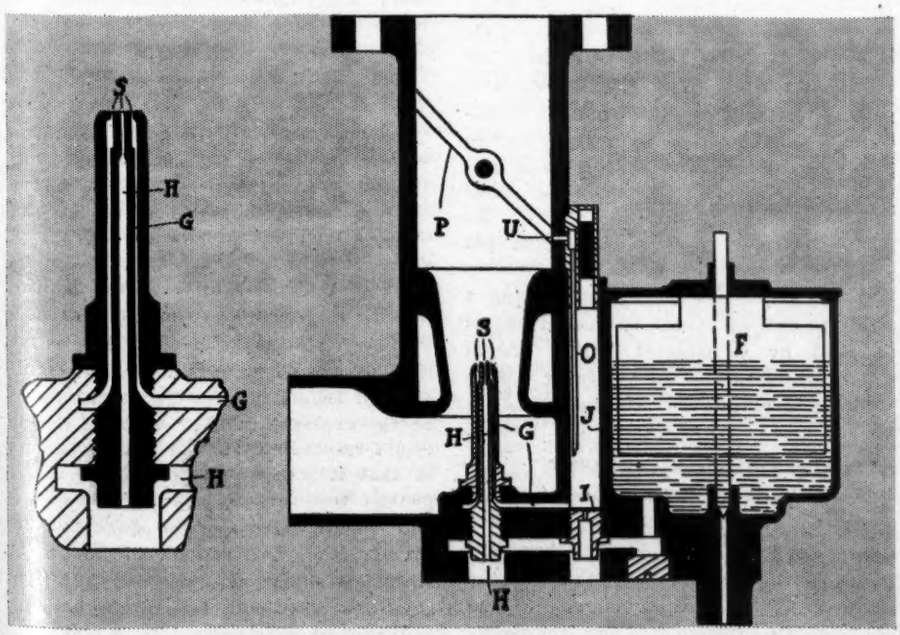



FIG. 2—H REGULAR NOZZLE, G COMPENSATING ONE

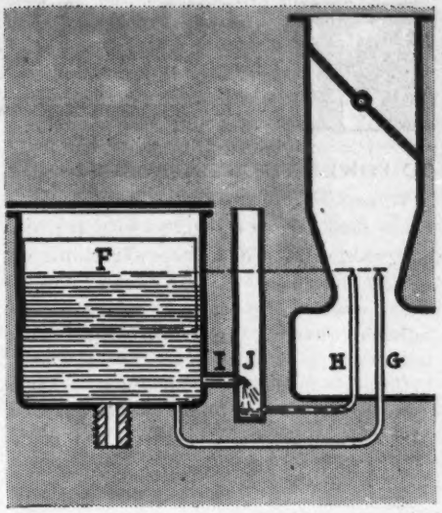



FIG. 1

## WATER AND FUEL TROUBLES

Now that cold weather is approaching, it is well to call attention to a possible source of trouble in cars using exhaust pressure for the gasoline feed. The exhaust gases are mainly composed of nitrogen, carbon dioxide and water vapor. The two former are permanent gases, but the water, of course, condenses. Usually the pressure system contains a separator which stops oil and water before they reach the gasoline tank, but as regards the water, this separation is only complete in case the gases are cooled to atmospheric temperature before reaching the separator, and it is not absolutely complete then. There is therefore a chance for the slow accumulation of water in the gasoline tank itself, and more rapid accumulation at low points in the pressure line. This water may freeze and render it impossible to pump up pressure in the gasoline tank by hand for starting, or to maintain pressure after starting until the car is warmed up to its work.

If the fuel consumption appears to be excessive it is worth while to make sure that there are no leaks in the gasoline line or the carbureter. Occasionally the unions at the ends of the gasoline pipe are bent slightly out of shape or roughened. The escape of gasoline due to a slow leak may be wholly taken up by evaporation. In time this will be betrayed by an oily accumulation about the point of the leak. A similar accumulation about the bottom of the carbureter will betray a leaky float valve. It is safe to say that nearly every float valve leaks more or less, particularly if the float needle is not weighted to keep it shut. Such leakage may easily amount to a quart or even more in a night without visible dripping. So long as the minimum demand of the engine exceeds the amount of the leak, the latter is of no consequence while the engine is running, but the tank valve should be closed every time the engine is stopped.

# The Readers' Clearing House

**EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.**

## TO LOWER THE COMPRESSION

Tecumseh, Mich.—Editor Motor Age—Since 1906 I have struggled with the high compression of a 35-horsepower motor car to the detriment of my morals and my back, when along comes a mechanic who tells me that if I place a $\frac{1}{16}$-inch plate between the cylinders and the crankcase, with proper openings machined in same, it will give me less compression and without detriment to the engine. Is the mechanic right? The present compression is a full 90 pounds. The expected compression will be about 75 pounds.—P. W. Fitzsimmons.

Using a $\frac{1}{16}$-inch plate between the crankcase and the bottom of the cylinders will have the desired result of reducing the compression, but Motor Age cannot say if the resulting low compression will be 75 pounds or not, because of not knowing the present capacity of each cylinder above the piston head at the top of the stroke. In using these $\frac{1}{16}$-inch plates, care must be taken to finish them perfectly on each side and having them perfectly drilled. The width of the plates must be greater than the width of the cylinder base flanges in order to give a rigid support. Because of the shape of the plates it may be necessary to do a little additional planing on the top of the crankcase to get a perfect repose for these plates. It must be borne in mind that the vertical of the cylinders must not be interfered with. Care must be taken to see that by raising the cylinders this high it does not bring any of the piston rings, when the piston is at the bottom of the stroke, too close to the open end of the cylinder. The regular cylinder retaining studs may be used if of sufficient length to accommodate the additional $\frac{1}{16}$ inch. With your reduced compression it is certain that the exhaust will not be quite so perfect, but this will not seriously affect the workings of the engine.

## LOOSE BEARING CAUSES KNOCK

Sea Gate, L. I.—Editor Motor Age—I am thinking of purchasing a 45-horsepower motor which is being sold cheap because of a knock. I have been advised that the walls are too thin, also that it is faulty construction. Will Motor Age, through the Readers' Clearing House, advise me the cause of the knock? The pound occurs on the explosion stroke and is accompanied by a sound like that of a pan being hit with a hammer, when the engine is fully opened up. The pound does not occur on low speeds or on one-half the gasoline supply.—P. S. Duffy.

The cause of the knock in this motor is undoubtedly due to a number of loose connecting rod bearings. If the knock were due to preignition, it would be noticeable on slow as well as high speed, which you say is not the case. It is impossible from the pitch of the sound of the knock to know whether the cylinder wall between the piston and waterjacket space is too thin or not, and this would not be in itself responsible for this knock. Knocks of this nature are generally due to the lower bearings of the connecting rods being loose, which can only be verified by seizing the connecting rod with the hand, entrance being gained through the lower half of the crankcase or side inspection holes. The majority of connecting rods have end play, but there should not be any looseness in an up and down direction. If such exists the bearing is in need of adjustment which may be done by removing shims, which are located between the end of the connecting rod and connecting rod cap. The shims are often thin sheets of copper or other metal. If these do not exist the only method of adjustment is procuring new bushings for the bearings.

## LOCK FOR MOTOR CARS

Indianapolis, Ind.—Editor Motor Age—On page 15, Motor Age, September 10, we note that a motor car lock is wanted by Detroit motorists. We would like to call your attention to the Break Circuit autolock manufactured in Indianapolis by us, which is a combination Yale lock and a patented circuit breaker, designed to prevent the stealing of cars when left on the sidewalk. The lock takes the place of the switch on the car and may be thrown from battery to magneto, or from one set of batteries to another. By pulling the switch bar forward, the circuit is broken and locked automatically, so that the motor cannot be started until the Yale key, belonging to this particular lock, is inserted and given a half turn which automatically makes the connection. The lock being a solid die casting cannot be opened and is installed by a patented wiring system which precludes the possibility of wiring or bridging around the lock switch to get a connection.—Safety Device Co.

## AFTER A FRICTION GEARSET

Demopolis, Ala.—Editor Motor Age—As a constant reader of Motor Age we have received much valuable information through its columns, and through the Readers' Clearing House learned of the Goodman Co., Bucyrus, O., who manufacture railroad tires for motor cars. Will Motor Age now inform us where we can obtain a friction transmission for use on a 60-horsepower, four-cylinder railway motor car, weighing 4,000 pounds, double side chain drive with differential in jackshaft?—Sledge Motor Car Co.

Friction transmissions for cars of this power might be obtained from such makers as The Buckeye Manufacturing Co., Anderson, Indiana; Gearless Motor Car Co., Rochester, N. Y., both of which manufacture a medium and high-powered car with friction transmission. The Gearless Company uses its transmission in cars with 75-horsepower.

## TWO-CYCLE ENGINE TROUBLES

Peru, Ind.—Editor Motor Age—I have been having a great deal of trouble with a two-cycle engine and would like Motor Age to help me out of my difficulty. My engine has good compression; in fact, I can turn it over very slowly without detecting any leakage. It is fitted with a Kingston carbureter, which works all right and which I have used a great deal on a four-cycle motor. I have worked several weeks on this and have not been able to make it shoot more than every second or third revolution and there is about 3 pounds of crankcase compression. Does Motor Age think that what little gas blows past the piston on the power stroke dilutes the mixture enough to prevent firing? I have a considerable amount of oil in the crankcase. Would the flying oil foul the gas mixture? Why should a steam car raise less dust than a gasoline car? What is the weight of an ordinary body in a 45 or 50-horsepower motor car? Is there any American manufacturer who makes cylinder and jacket castings separate?—Reader.

The trouble rests either with your carbureter or ignition. It is a fact in two-cycle construction that too rich a mixture will result in the cylinder firing every other revolution, thereby acting as a four-cycle engine. While this is the case and many attempted explanations have been given as to why it is so, none of them is at all satisfactory. The ignition troubles may be due to sooted plugs caused by too great amount of oil. There is not the slightest reason why any of the crankcase oil should be blown past the piston on the explosion stroke. In fact, the oil is not responsible for the missing, except in that it might soot the plugs. Three pounds compression in the crankcase is quite enough to insure a good mixture through the combustion chambers. A steam car should not raise less dust than a gasoline one, simply because one is steam and the other gasoline. It is a known fact that much dust raising is caused by

the size of the tires and the under contour of the car. If a car has high clearance and a comparatively clean underpan, it will not raise so much dust as one with a low clearance and having some transverse member, like a muffler or a gasoline tank, carried on the rear of the chassis and hung very low. Bodies for 45 or 50-horsepower car will range in weight from 500 pounds up. This refers to the body, not the body equipment included. Motor Age is not aware of any American maker who builds motors with separate cylinders and cast waterjackets. There are not a few makers using copper waterjackets which are separate from the cylinder castings but none using what is known as the "liner" construction, in which the cylinder wall is a steel tube fitted within the casting forming the waterjacket.

## BIG SHOW DATES

Milwaukee, Wis.—Editor Motor Age—Will Motor Age give us the dates of the New York and Chicago shows?—Bland-Mueller Auto Co.

The following are the dates of the New York and Chicago shows: Chicago Coliseum show, February 6-13; New York Madison Square garden show, licensed, January 16-23; New York Grand Central palace show, December 31 to January 7.

## EDGE ON LONG-STROKE ENGINES

London, Eng.—Editor Motor Age—In the matter of long stroke engines I wish to add a word to my communication of 2 weeks ago. The formula

$$HP = \frac{D^2 \times N}{2.5}$$

rates a motor with a short stroke the same as one with a long stroke, provided the piston area is the same in both, and although the performance of the long stroke motor, so far as actual horsepower is concerned, is undoubtedly better than the one with the short stroke, yet by rating their performances should be similar. Actual experience teaches that the formula does not give a true rating, and if the rating is to be a measure of the horsepower developed, the length of stroke must be introduced into the formula. It seems so very simple to have a formula which takes into account stroke, and I do think that whatever formula is selected, it should be reasonably near the actual brake horsepower that the particular engine being calculated should give, if it was a modern, efficient, commercial engine.

The calculation of the power of an engine must necessarily be based upon the force behind the piston and the speed at which it moves, whatever means are taken to express this; that is to say, we have three factors which it is necessary to ascertain before the power of an engine can be calculated, namely, the area of the piston, the pressure per square inch to which this area is subjected, and the number of feet through which the piston moves in 1 minute. It is obvious that it is only on the first of these three that definite limits can be put, and that any limits selected for the other two figures must be purely arbitrary and liable to require revision from time to time, the only alternative being to measure them on each individual engine. It seems to me that this would be too big a task to be undertaken for general purposes, and that the simplest way is to select what is known to be a fairly high average in each case. This would mean that designers would be stimulated to raise these figures to the greatest possible extent.

If we start with the usual horsepower formula

$$\frac{P \times A \times S}{33000}$$

where P=mean effective pressure in pounds per square inch
A=11 times $D^2$=area of piston

$$\frac{}{4}$$

S=L×N×2=piston speed in feet per minute where
L=length of stroke in feet and
N=number of revolutions per minute

the simplest way is to boil it down by obtaining a constant from all the known or arbitrarily selected figures by which the variables can be multiplied or divided. To illustrate this, I assume a mean effective pressure of say 80 pounds per square inch, and a piston speed of say 1,400 feet a minute, we then get the following formula from the above:

$$\frac{P \times L \times N \times 2 \times 11 \times D^2}{4 \times 4 \times 33000}$$

Assuming a square engine, say 5 by 5 inches, a piston speed of 1,400 feet per minute would involve a speed of 1,680 revolutions per minute, the formula therefore becomes:

$$\frac{80 \times L \times 1680 \times 11 \times D^2}{2 \times 4 \times 33000} = L \times D^2 \times 1.6$$

the result being the horsepower of one cylinder. Assuming a 5-inch by 5-inch engine, this formula gives 16.5 horsepower per cylinder, a figure quite easy to obtain, but assuming the stroke increased to 7 inches the formula gives 23 horsepower. On the other hand, for a 4-inch stroke 13.3 horsepower is obtained. The difference in horsepower between the extremes in this formula seems to me rather great, and possibly would tend to too much restrict the permissible variation in stroke. The way to correct this would be to use the square root of the stroke as a multiplier and suitably reduce the constant, this gives us the following formula:

$$\sqrt{L} \times D^2 \times 1 = HP$$

This gives us for a 4-inch stroke cylinder, 14.25 horsepower; for a 5-inch, 16 horsepower; for a 6-inch, 17.5 horsepower, and for a 7-inch, 18.9 horsepower. These proportions are in accordance with practice. At the same time, the variation between the extremes should be sufficient to restrain designers from adopting extremely long or extremely short strokes in their motors.—S. F. Edge.

## SELLING COTTER-PIN PATENT

Owensboro, Ky.—Editor Motor Age—Being a constant reader of the Readers' Clearing House, will Motor Age inform me how to sell a patent? I would also be glad to hear from some of the readers of these columns as to the best way of disposing of a simple invention. I own a patent, No. 872,180, on a self-spreading cotter-pin. The device is simple, cheap, easily made and a great labor saver.—Frank E. Hite.

The best way of disposing of a patent of this pattern of this nature is to bring it to the attention of some of the large makers of motor cars, or some of the big screw machine companies. The Rambler makes use of special locking means of its own, so do one or two other companies, and it might be an easy matter to show this cotter-pin to the engineers or factory superintendents of such companies. If you cannot visit the factories of these companies, send a sample or two, drawing attention to its construction and advantages. Motor Age readers are invited to give whatever information they have on the disposition of small patents of this nature.

## NOISE IN PLANETARY GEARSETS

Jackson, Mich.—Editor Motor Age—I note frequent mention in the columns of the Readers' Clearing House to noise in planetary gearsets, and having had a great deal of experience with these in our cars, a few words on this subject may be in order. We have used a good many planetary transmissions and of course have gained some points about these transmissions which have enabled us to improve them from time to time. One of the principal points which we have studied has been noise. We have found that the cause in these transmissions is caused by the gears getting out of alignment. These are allowed to get out of alignment by the wearing of the bushing in the gears, possibly, or the studs on which they run. On account of this we have for the past year made all bearings in Jackson planetary transmissions 2 inches long and ¾ inch in diameter; the stud hardened and ground, and the gear fitted with a phosphor-bronze bushing. These bushings have oil grooves. We do not believe it is possible to get a better bearing. We have also hardened the gears, which reduces the wear as much as possible. We have studied very carefully, also, the cause of excessive wear of the transmission gear bearings, and find we believe most of this wear comes from the lack of proper lubrication. The planetary transmission is a hard piece of machinery to build so that it will not leak

oil, and we believe that a good many drivers of cars containing these transmissions do not realize the importance of keeping oil in the transmission, also using the proper oil. We have studied carefully the best means of keeping this oil in, and have found that by making bronze bearings, and fitting them properly, and providing them with oil grooves, we can make them tight enough, so that one fill of the transmission will run 500 miles. In filling the transmission, we fill it only about half full or until the oil comes up to the center shaft. We have also found it advisable in our transmissions to use a very heavy transmission oil of good quality in the place of hard grease or graphite. We fit our bearings very close, and for that reason must have an oil that will get into these bearings and keep them lubricated, but also thick enough to prevent excessive leakage that would naturally occur by using a thin oil.—F. L. Holmes, Jackson Automobile Co.

## FOREIGN MOTOR CYCLE ADDRESSES

Monterey, N. L., Mex.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, give me the names and addresses of the makers of the Minerva, F. N., Peugeot, N. S. U. and Rex motor cycles?—Luis Maiz.

The N. S. U. motor cycle is manufactured by the N. S. U. Motor Co., 206 West Seventy-sixth street, New York city; F. N., by the Ovington Motor Co., 2234 Broadway, New York city; Peugeot, by A. Peugeot, 56 rue du Vieux, Pont-de-Sevres, Billiancourt, France; Minerva, by the Minerva Motors, Ltd., Berchem-Anvers, Belgium; and Rex by the Rex Motor Mfg. Co., Ltd., Coventry, Eng.

## VALUE OF MAGNETO SYSTEMS

Evanston, Ill.—Editor Motor Age—I have had many arguments with several motorists and repair men as to which is the best, most simple and most satisfactory magneto used on the average motor car today. With due respect to all and favors to none, I would ask Motor Age which in its estimation is the best, the Bosch high-tension with direct wires to plugs, or the Eisemann with high-tension coil—the latter, I understand, requiring very fine adjustment and has much more wiring and connections. The low-tension is used with the make-and-break system and I have noticed that most make-and-break leak compression after being used a short time and it cannot be made into a double independent system as both currents pass through the make-and-break. In my opinion the Bosch high-tension magneto and battery outfit, good four-point coil, also two sets of spark plugs, is the best system for ordinary use.—T. B. Davis.

One of the extremely simple ignition systems is the Bosch low-tension, in which the ordinary make-and-break igniting mechanism on the top of the motor is eliminated, and in its place is used a set of Bosch electro-magnetic plugs, in each

of which is incorporated a make-and-break apparatus of the simplest nature. These Bosch make-and-break plugs thread directly into the caps over the valves and are as readily removable as the spark plug. With this system the wiring is confined to four leads direct from the magneto to the plugs and a fifth lead to the dash which is to a switch used to cut out the current by short circuiting the armature. In this system the only wiring used is of the low-tension type and consequently the troubles of high-tension insulation are practically done away with. In the Bosch high-tension magneto, the wiring consists of leads from the magneto to the four plugs. In the Eisemann low-tension magneto the low-tension current generated is delivered to a single non-vibrating coil on the car which is in reality a step-up transformer. The high-tension current is then distributed to the plugs through a distributor carried in the magneto. It is difficult to draw up comparisons relative to the amount of attention required by an Eisemann and Bosch high-tension system, as the attention required by each depends to a great extent on the knowledge of the operator of a car, and the care given the different systems. The high-tension magneto with contained distributor calls for less wiring than the low-tension type with non-vibrating coil located on the dash or elsewhere. The Bosch low-tension type with electro-magnetic plugs was illustrated and described in Motor Age, issue of July 2, 1908, pages 30 to 32 inclusive.

## MAY BE IGNITION TROUBLES

Clinton, Ind.—Editor Motor Age—I am having trouble with my four-cylinder Marion air-cooled engine and being unable to locate it would like Motor Age to tell me the cause if possible. When the engine is idle each cylinder will fire at the proper time; when the car is in motion, it will skip from one cylinder to the other, but when climbing a hill or speeding up the cylinders will fire properly until the car has attained headway when they will again miss. I have overhauled the coils and as far as I can see they are all working properly; have tried adjusting the carbureter, but am unable to make it work satisfactorily.—Arthur B. Roberts.

It appears as if your battery were weak or that there is some other trouble in connection with your electrical system. With the engine running idle and each cylinder firing properly, it shows that your electrical system is all right; but, the fact that it misses under a load suggests there is not sufficient electrical energy in the batteries to work the coil properly. I would not tamper with the coil further than the vibrators and testing them to see if there are any current leaks. Motor Age knows of cases of this kind where the carbureters were taken to pieces and put back only to discover that the batteries were at fault. It is difficult to understand why the engine will not miss when the car is climbing a hill or speeding up until it has attained headway when missing will occur again. It may be the carbureter float is not working properly and that the needle valve sticks occasionally, which would give a sputtering of the engine rather than intermittent missing. I should examine the commutator to see that all parts are intact, as frequently a loose or misplaced part will cause the trouble.

## COMET AND ITS DETAILS

San Francisco, Cal.—Editor Motor Age—I am a subscriber to Motor Age and have been following its articles closely. I note that in issue of September 3, page 9, appears an article concerning the Comet car and its performance at Santa Rosa on August 22-23. The car we used at that meet was built in '06 and has been used continuously over these roads since the bearings were scraped in and put on the track. The article in Motor Age states that there is only one in existence. At present there are eight in use and fifteen under construction. On August 23 this car broke the world's record for 2 miles, held by an eight-cylinder Premier, driven by Carl Fisher on the Harlem track, also the Pacific coast record for 1 mile stock cars. The Comet has a motor 4 inches square of the valve-in-the-head type.—F. Free.

Motor Age has been in communication with William R. Johnston, of San Francisco, Cal., relative to the Comet car and is informed that it is manufactured by the Hall Auto Repair Co., 640 Van Ness avenue, San Francisco. It has a 25.6-horsepower, four-cylinder motor of the valve-in-the-head type, with cylinders 4 inches square. It is manufactured in three models—runabout, roadster and touring car—with 102-inch wheelbase. Fifteen cars of this type are on the streets of San Francisco every day and when Mr. Johnston visited the factory he saw seven in course of construction.

## "DONT'S" FOR SMOKERS

New York—Editor Motor Age—I was particularly interested in an editorial in Motor Age some weeks ago on the smoke cloud caused by motor cars on boulevards and in parks, and agree with you that unnecessary smoking is caused by poor lubrication. Great clouds of thick white smoke, issuing from the exhaust, indicate a needless use of cylinder lubricants. That proper lubrication is the life of the car has been pretty thoroughly drummed into the minds of even the tyro motorist. The following don'ts give some practical pointers that are well worth remembering:

1—Don't allow your motor to exhaust clouds of white smoke. Just enough oil is better than too much, and may keep you out of the police station besides.

2—Don't try to make a light oil by mixing a heavy oil with kerosene. Now that cold weather is about to set in, if the oil you are using does not flow freely, use a lighter grade of oil. Heavy oil thinned with kerosene is a common cause for cylinders carbonizing.

3—Don't assume that your engine is getting the proper amount of oil. Make sure by examining the sight feeds regularly. Starve an engine on oil and it may be seriously damaged even before it begins to show signs of distress by pounding or laboring.

4—Don't imagine that because you ask for a certain brand of oil that you will always get it. There is so much substitution in the oil business nowadays that the wise motorist makes sure that he gets what he asks for. The majority of motorists give careful attention to the lubrication of their engine, and see that the transmission, rear axle, et cetera, are packed in grease. If the same attention were given the other moving parts, a large amount of wear and tear, that perhaps they now regard as inevitable, would be eliminated. For example: The steering knuckles, steering connecting rod and, in fact, the hundred and one small moving parts of a motor car, should be thoroughly oiled. Ten minutes' judicious use of an oil can every day will save a motor car owner a good many dollars in repairs and replacements at the end of the season.—G. A. Haws.

## MEASURING GASOLINE SUPPLY

Hartford, Conn.—Editor Motor Age—I was pleased to see in the September 17 issue of Motor Age, page 26, an arrangement for telling how much gasoline there is in a tank, and thought I would send in my method for the benefit of your readers. I purchased for 5 cents in a drug store a glass pipe about ¼ inch in diameter with a ⅛-inch hole, and about 2 inches longer than the depth of the tank. By putting this down into the tank and placing my finger over the top, then withdrawing the tube, all the gasoline that entered the hole is held there by atmospheric pressure, showing immediately the depth of the liquid in the tank. When the finger is removed, the gasoline runs out. I put two small leather loops on the underside of my seat over the tank, and push the glass tube into them, where it is always ready for use.—H. B. P.

## PER CENT OF GRADES

Cincinnati, O.—Editor Motor Age—In the September 10 issue of Motor Age, page 18, is a diagram representing different degrees of road grades—in connection with the Algonquin hill-climb. I always have been under the wrong impression that 100 per cent represents the maximum grade, that is 90 degrees. Accepting the Motor Age solution that a 100 per cent grade is 100 feet rise to each 100 feet horizontally, I wish to ask if grades exceeding 45 degrees could be properly designated by per cents exceeding 100, and if this is not a deviation from the regular application of per cent methods as we were taught in our arithmetics.—M. G. Augspurger.

In the measurement of grades, while 45 per cent represents a grade with 100 feet rise and 100 feet horizontal, it is possible, according to the accepted methods of grade measurement, to have grades in excess of 100 per cent. It is, however, common practice to have percentages in excess of 100. An example of this is when stocks more than double in price, the par value going to, perhaps, 115 or as high as 500 per cent. There is in reality no limit to the application of the term percentage, the 100-mark not marking its maximum. It must be admitted, however, that much debate has taken place on the percentage of grades, and for ordinary calculations the relative relationships of the horizontal and vertical have been considered.

## NEW CHANGES IN JACKSON F

Youngstown, O.—Editor Motor Age—Will Motor Age give its opinion of the model F Jackson? Is it an experiment? I have had people tell me, "Wait until it has run a season." Will there be any change in the 1909 car?—W. C. Whitten.

The Jackson model F car, according to statements made by some of the agents selling it, has been manufactured in quantities of upward of 800 this year, the sales in and around Chicago approximating seventy-five. The car is to be continued for the 1909 trade with few changes other than the lengthening of the wheelbase. Its motor is a two-cylinder opposed power plant, 20 horsepower, with the cylinders having 5-inch bore and 4-inch stroke. Transmission is through a planetary set, with shaft drive.

## QUESTIONS DEMOUNTABLE RIMS

Richmond, Va.—Editor Motor Age—As a reader of Motor Age and having taken particular interest in the articles appearing lately in regard to demountable rims, I would like to express my views on the subject. In my judgment the rim of the wheel is the wrong place to make the detachment, for, while this might appear theoretically right, there are a number of obstacles to prevent its working successfully in practice. In the present state of the art, there seems to be no certain way of fastening the rim securely to the wheel—this being shown in a recent test as well as in the grand prix—which destroys the factor of safety, a most important consideration. Furthermore, the various strains imposed on a wheel at its periphery, including that of skidding, makes it very liable to get out of true, which condition would make the proper manipulation of

the rims very uncertain; then, again, the construction is such that it is not adapted to the various quick detachables now in use, nor are they very well suited to receive very long lug stems, all of which would seem to handicap the success of the demountable rim. In view of the foregoing, and in addition to the liability of the wheel itself to collapse from accident or otherwise, I have designed a demountable wheel which can be readily applied to front or rear axle in less than 1 minute by one man, and which permits the use of any kind of rim, tire, or lugs, and is absolutely safe at all times and certain of operation. By this method a smashed wheel can be replaced as well as a bursted tire. As I am not in this line of business, merely owning a car, I would appreciate the opinion of Motor Age as to the probable success of same.—James H. Clark.

Motor Age thinks what you say regarding wheels becoming deformed at the periphery is quite true, but your objection to demountable rims, in that you cannot use the various quick detachables on them, is scarcely right, because, if you will note in September 17 issue of Motor Age, there appears an illustration of the Nadall demountable, on which quick detachables of any nature may be used. In fact, mechanically designed tires may be employed on this rim, which is secured by an expanding wedge action. Much of the trouble in the grand prix, due to demountable rims coming off, was caused by an improper inflation of the tires. It is also a fact that the demountable rim question is still in its infancy and we should not look for perfection for a year or so. Not a few foreign makers fit the demountable rims as standard and three or four American companies are operating along the same line. Motor Age sees no reason why the demountable rim, on which can be used a quick detachable, should not be made standard in American construction.

## CARBONIC ACID GAS MOTOR

Edgar, Ill.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, inform me if the designer of the new motor which derives its power from carbonic acid gas, described in Motor Age August 27, page 14, has yet made any public display of its motor, or if the article as printed has been verified by later investigation? Has Motor Age made personal investigation as to the statements made in the article? If true, the carbonic acid gas motor, invented and displayed in Philadelphia, would revolutionize power as applied to the motor car. I, along with many other readers, have read this article with skepticism.—H. Parker.

Motor Age's Philadelphia representative was present at the demonstration given by Carroll's carbonic acid gas motor, made in that city. Further than this, no investigation of the affair has been made, or later verifications of the working of the car looked into.

# RATING HORSEPOWER IN MOTOR CAR MOTORS

**EDITOR'S NOTE—Paper prepared by Thomas J. Fay, president Society of Automobile Engineers.**

TO derive the horsepower ability of a motor in the absence of an actual test, is but to make an attempt to anticipate what the actual test would naturally disclose. It follows, therefore, that the actual test is the one best way: all others are simply approximations, and nothing more. Some engineers employ very simple and abbreviated empirical formulæ, in order that the attempt at approximation will be the least possible trouble. In one case that came to the notice of the author, the error was 50 per cent the wrong way, that is, the motor was capable of delivering 50 per cent more power than the makers thought it would.

The necessity of parading an overgrown horsepower rating, is not apparent, since if the motor is big enough to do the work, the smaller it happens to be, in any given case, the better for the owner of the car it is used to run.

The most abbreviated formula yet offered, is that used by the A. L. A. M., as follows:

$$\text{H. P.} = \frac{d^2 N}{2.5}$$

in which H. P. = the alleged horsepower of the motor; $d^2$ = the square of the bore of the cylinder in inches; N = the number of cylinders; 2.5 = a constant said to serve the purpose, in view of the actual ability of motors, and in further view of the similarity of the several makes of motors.

This formula says that a motor, of any stroke now used in motor car motors, will cover the requirements on the ground that the several motors are so near in point of stroke, as not to make a material difference in the actual power delivered by them.

Taking a given sized motor, as a four-cylinder, 4 by 4-inch bore and stroke of cylinders and pistons respectively, the rating would be:

$$\text{H. P.} = \frac{4^2 \times 4}{2.5} = 21.6$$

It is assumed that the speed will be the maximum possible; the highest attainable under which the product of the torque and the speed will afford the maximum possible. To obtain any kind of accuracy, quite a number of assumptions would be necessary, to say the least. But if all the motors are very much alike, and all are compared by the one formula, results a little high, or a little low, as the case may be, a correction can be introduced at any time, and will serve equally for all. No sooner is a rule promulgated than there is a desire to get around it. This rule, for instance, is the root of the innovation known as the "short stroke" motor. When the rule was promulgated, the majority of motors had strokes not far from 5½ inches, with a few longer, and some with a shorter stroke.

That the stroke does enter into the problem, can scarcely be denied, and that the stroke is now shorter than it would have been, in the absence of the rule, is a matter that can be taken for granted. Yet, it is possible the short stroke is a very good thing, from more than one point of view. The motor is lighter, the cylinder castings more regular and the difference in power is not so great as to defeat the main objects. As before stated, if a motor is of the proper size to do its work, it is the right size to use, on the ground of economy. If a motor is so large that it cannot be run at its economical load, its higher full load efficiency is valueless, since in service the necessary full load will not be available. A smaller and probably less efficient motor might serve with better results, for the very simple reason that it may be run at its most economical load.

An empirical formula, taking the stroke into account, might read as follows:

$$\text{H. P.} = \frac{d^2 (l\,k)\, N\, S}{10^9} \times f = \text{approximate power,}$$

in which $d^2$ = the square of the bore in millimeters; l = the length of the stroke in millimeters; k = a constant, depending upon the length of the stroke; N = the number of the cylinders — four-cycle motor—S = angular velocity in revolutions per minute; f = a factor of compression; $10^9$ = a figure of convenience.

If the bore is not over 6 inches—152.4 millimeters—the values of k might be taken thus: k = unity for 6-inch stroke; k = .90 for a 5-inch stroke; k = .80 for a 4-inch stroke; k = .70 for a 3-inch stroke.

The exact values of k would certainly be subject to several conditions and to a series of variables besides. In a matter of this sort, however, many of the conditions tending to shift the k values would cancel themselves in service. These values are also dependent upon one other consideration that cannot well be eliminated, i. e., the speed of a 4-inch stroke motor will be higher—considering the highest value of speed and torque—than the speed of the 6-inch motor, and it follows that the actual reduction of power due to shortening the stroke is in a measure compensated for by the increase in speed, but the compensating factor will not suffice to wholly counteract the influence of the shorter stroke.

This counter influence, however, does so materially aid the process, as to warrant one in taking the k values as given, rather with the hope that, in the better class of motors, the k values might be increased somewhat. It must not be assumed, though, that the mere fact that a short stroke motor would run at a very high speed, is a warrant for so doing; there is a limit in practice to the speed *per se;* and that is the limit to take into account in deriving any empirical formula, on the ground that such a formula is but a practical device, at best. It would be out of the question to attach a theoretical speed to a practical formula and call the whole practical.

The values of f will change with the compression, and with the fuel, considering a given compression. If gasoline is taken as the fuel, and the compression ranges between 75 and 95 pounds per square inch absolute, the f values for the conventional types of four-cycle motor car motors might range about as follows:* f = 5.5 at 85 pounds per square inch—absolute—compression; f = 5 at 75 pounds per square inch—absolute—compression; f = 6 at 90 pounds per square inch—absolute—compression.

In these deductions will be found ample room for controversy, for reasons that, in a theoretical sense at any rate, are perfectly good. On the other hand, it is a fact that motors, as they actually obtain, will not do better than the values of f as here given. But the author attaches more importance to the effect on speed of the motor, as a result of higher compression than he does to the direct influence of that compression. In other words, if the compression is low, a relatively slow speed motor will result due to ignition troubles, more than to anything else, at the higher speeds. But if the compression is high, approaching the point of pre-ignition, the ills that such a condition will engender must be borne. Increasing speed, unfortunately, increases the richness of the fuel and increases the hydrogen present. If it is true that different mixtures of a given fuel will perform differently, it is well within the bounds of good practice to say, equal mixtures of different gases will not afford equal results. It is plain then that a high compression can result in increased power, and would influence the f values, more than the amount given, were it not for the fact that the conditions to be maintained are beyond the bounds of common practice.

In a racing car, for illustration, it is possible to utilize the higher compression because the driver is skilled and the carburetion is looked after in the most careful manner. The more complete formula, taking the same problem as before, would afford results as follows:

$$\text{H.P.} = \frac{100^2 \times (100 \times .80) \times 1{,}500 \times 4 \times 5}{10^9} = 24$$

which is a very high value. Built as some motors are, the factor of compression might well be 4 instead of 5. Certainly, the average motor of this size uses enough fuel to enable it to deliver the power stated, and if the thermal values, usually taken for motors, have any underlying rea-

*The values of f given are on a basis of the actual compression, at the speed of the motor, at which the power is delivered. Cold compression is quite another matter.

son for their existence, it is within the range of probability that the values given are approximately right. It is the factor of compression that must be adjusted, as between the respective motors and the author cannot accomplish such a task, merely in the act of devising a formula. This statement strikingly illustrates the earlier one, that is, "the actual test would naturally disclose the actual horsepower of a motor."

The horsepower of a motor increases in direct proportion to the speed, if the torque holds constant. It is unfortunate that the torque does not remain constant, or does it increase with the speed. Indeed, it falls off with alarming rapidity under certain conditions as:

A—If the compression is low and the mixture leaks by the valves or the piston.

B—If the valves are too small.

C—If the valves are not properly timed.

D—If the cooling system is defective, a common complaint.

E—If the spark is not properly timed, assuming it is otherwise adequate.

If it is true the torque will not hold constant, with increasing speed, this fact must be taken into account in any formula, but since it is the lowering compression that effects the torque, it is the factor of compression that must be adjusted in an empirical formula.

The torque of a motor, which for convenience may be called the "mean effective pull in pounds," at unit radius—1 foot—may be known as follows:*

$$H.P.=\frac{2n\left(\frac{H.P.\times 33{,}000}{2n\,S\,P}\right)\left(\frac{H.P.\times 33{,}000}{2n\,R\,P}\right)\left(\frac{H.P.\times 33{,}000}{2n\,R\,P}\right)}{33{,}000}$$

hence:

$$P=\frac{H.P.\times 33.000}{2n\left(\frac{H.P.\times 33{,}000}{2n\,S\,P}\right)\left(\frac{H.P.\times 33{,}000}{2n\,R\,P}\right)}$$

Simplifying, the formulæ will result in:

$P=\frac{H.P.\times 33{,}000}{2n\,R\,S}$ =pull in pounds at radius taken;

$R=\frac{H.P.\times 33{,}000}{2n\,P\,S}$ =Radius;

$H.P.=\frac{2n\,R\,S\,P}{33{,}000}$ =approximate horsepower;

$S=\frac{H.P.\times 33.000}{2n\,R\,P}$ =angular velocity revolutions minute

There would be no need to set down the above formulæ, either in the involved or in the simplified form, except to show the source of the simplified form and to point out that in mathematics the abstract is ever available, to no practical purpose, since to know the value of the horsepower or the torque, one must first determine their values by an actual test. Having made tests on the various types of motors, however, one may then assume values to the extent necessary to obtain the remaining values. If we assume the radius as unity, it does not become necessary to solve for the same; likewise, if we know the maximum speed permissible in practice, this may be assumed, if it is known that the motor will perform at such a speed.

*n=3.1416

For a motor to merely turn over at a given speed, is not enough; it must deliver power in a manner to satisfy the formula, else the speed assumed will introduce a fallacy. The only way to be certain that the speed will be that of the maximum power is to test the type of motor under actual service conditions sufficiently to establish the facts. The relation of speed to torque, in actual practice, is such that the maximum power does not, as a rule, obtain coincident with the maximum speed or with maximum torque. As the formulæ show, the power is in direct proportion to speed and to torque; as the speed increases, the power increases, if the torque remains constant, which is not true in practice, as the following records of tests will adequately illustrate:

SPEED AND TORQUE TEST

150 mm stroke and bore Fiat motor, four-cylinder, four-cycle

| Speed | Pull in lbs. Pull in pounds | |
|---|---|---|
| 1,090 | 341 | =1,090 × 341 = 371,690 |
| 1,412 | 315 | =1,412 × 315 = 444,780 |
| 1,800 | 262 | =1,800 × 262 = 471,600 |
| 1,920 | 210 | =1,920 × 210 = 403,202 |

As will be observed, the maximum value, due to multiplying speed and torque, fell at the point next to the lowest established by the test, and with the speed next to the highest observed during the test. A number of trial tests were made, to show that no better results would follow at other higher or lower speeds. Increasing the speed beyond the highest speed given above resulted in an alarming reduction of the torque, while at lower speeds than the lowest recorded here, there did not result such an increase as to compensate in any measure for the reduction in speed. The general behavior of the motor was such as to lead one to the conclusion that no further display of skill would enhance the results in any way.

No empirical formula would predict any such results, because in this case the maximum power was produced at a piston travel of 1,800 feet per minute, which is 800 feet per minute higher than the empirical formula contemplates. The formula of the A. L. A. M. would fix the horsepower-rating of this motor as 57.6 horsepower. To show how much motors can vary, another torque test was as follows:

SPEED AND TORQUE TEST

165 mm bore by 170 mm stroke, four-cylinder, four-cycle motor

| Speed in r.p.m. | Pull in pounds at 1 ft. rad. | Speed × Torque |
|---|---|---|
| 800 | 446 | =356,800 |
| 900 | 390 | =351,000 |
| 1,000 | 350 | =350,000 |

Below 800 revolutions per minute there was no increase in torque to compensate for a reduction in speed, hence it was fair to take 800 revolutions per minute as the speed of maximum power. This was a case in which the maximum power was developed, below the piston travel—1,000 feet per minute—assumed in the case of the A. L. A. M. formula. Both of these motors were designed to do just what the tests showed; one as a motor for racing cars, in which the power of the higher speed could be utilized for a short time, and the other for a racing motor boat, in which the propeller could not—at that time—be designated for a higher speed. Both were used in motor car work, but only one could claim a place in boat work, that is, on a basis of the delivery of the maximum power. In marine service, the last named motor would deliver the maximum available power at a lower speed, because it was designed to do so. How, then, can any simple formula serve for all motors, in view of such marked differences? Indeed, the differences noted do not cover the range, because both motors cited were of the finest of the time, and indifferently designed motors would not do nearly as well as either one of them.

Indirectly, a torque curve is the equivalent of an indicator card. However, if the card is available, it becomes possible to note why a motor fails to perform up to the normal. If the card can be had, the formula will read as follows:

$$H.P.=\frac{PLAN}{33{,}000}$$

in which H. P. = the indicated horsepower; P = the mean effective pressure; L = the length of the power stroke in feet; A = the area of the piston in square inches; N = the number of the power strokes per minute.

In a single-cylinder motor, of the four-cycle type, there will be one power stroke for every two revolutions, hence, if the motor is of the four-cylinder type, there will be one power stroke for every revolution. The number of the power strokes then may be found as follows, for any number of cylinders in a four-cycle motor:

$N=\frac{C}{4}\times S$ in which C = the number of cylinders; S = the angular velocity of the crankshaft in revolutions per minute.

In this formula the compression is taken into account, in that the mean effective pressure P, involves the same element. It will be observed, however, that the result is in indicated horsepower, instead of actual horsepower. The losses in the motor are not taken into account in this case and since they are of considerable moment, besides being difficult to ascertain in the absence of the brake test the method does not spell finality. Up to the present, in this discussion, the idea of predicting what the rating of a gasoline motor should be in horsepower, assuming a four-cycle motor, was uppermost, but it cannot be claimed that the methods disclosed availed much by way of accuracy.

If the four-cycle motor will not lend itself to the problem, it is not believed the two-cycle motor will stand for any prognostication at all, as the variables in the latter are much more difficult to arrange. In the two-cycle motor, the compression—cold—means very little, because it is impossible to say to what extent the mixture is contaminated as a result of the speed of the motor crankshaft.

# SCIENTIFIC CARBURETER ADJUSTMENT

**By Herbert L. Towle**

MANY pages have been printed on the subject of scientific carbureter adjustment. Nevertheless, the man who has installed a carbureter of unfamiliar make is apt to find all his carefully studied principles oozing away as he heatedly grinds away and the motor fails to start.

In the present stage of the carbureter art, the old non-automatic type of carbureter may be ignored, and the automatic carbureter may be broadly classified into the auxiliary air valve and the "puddle" types. Owing to certain characteristic differences in behavior it will be best to treat these types separately. Inability to start the engine, to speed up, or to run as slowly as one would like may all be due to either too little or too much gasoline. To determine which is the cause one must be guided by other and sometimes very subtle symptoms. Of the grosser symptoms of poor mixture it may be said that overheating, if not due to slipping of the fan belt or clogging of the water passages, is caused generally by too much, rarely by too little, gasoline. Black smoke indicates a very considerable excess of gasoline, and popping in the carbureter indicates too little.

As the first essential is to get the engine started, we will consider that first. With any spray carbureter, the mixture for starting must be obtained by priming. It is however, possible in this manner to make too lean or too rich a mixture; and if the adjustments are decidedly wrong the mixture formed on the first few revolutions will be so bad that the motor will stop. Sometimes the float is too high or too low, and the gasoline overflows the spray nozzle continually, or is so low that a considerable suction is required.

It is best to observe whether gasoline drips after the float chamber has had time to fill. If no dripping occurs, depress the float, and on the first sign of dripping crank the engine immediately. If it does not start, prime the carbureter again. If this fails, shut off the gasoline at the tank, and if there is a drainage outlet from the float chamber draw off a couple of teaspoonsful of gasoline. This weakens the mixture. Repeated cautious experimenting in this manner will soon establish the priming required to start the engine when cold. When it is warm the gasoline evaporates more rapidly, and caution is required not to prime too much. Many carbureters with a small primary air passage will start the engine without priming, once they are properly adjusted.

If the engine starts, but immediately dies down, try holding the float down. If the cause of dying down is too weak a mixture, this will keep the engine going. See that the gasoline level is not more than $\frac{1}{8}$ inch below the spray nozzle A1, Fig. 1, and readjust if necessary. If the engine still stops, the mixture is too rich.

If the carbureter drips when standing, the float valve should be investigated. If pressing it shut stops the dripping, the float is too high. If the dripping persists, the valve leaks and must be ground to a fit, preferably using pumice stone, since emery is liable to embed itself in the brass. Occasionally a float and float valve are so arranged that the valve, although tight in one position, may slant over a trifle and leak from that cause. Such carbureters are a nuisance, since the gasoline level constantly varies. The automatic air valve B, Fig. 4, is not supposed to open when the engine is run slowly with the clutch released; consequently we have first to deal only with the adjustment of the spray orifice A or of the primary air opening D. Some carbureters have a fixed primary air opening, and control the spray orifice by a needle valve E, while others have a fixed spray orifice A1, Fig. 1, and control the primary air intake F. Reducing the primary intake produces a greater suction, and is equivalent to opening the spray orifice. Adjusting to keep the engine running on a low throttle is therefore a simple matter. Let us assume the engine to run smoothly on a low throttle. The spark is now fully retarded, and with the clutch still disengaged the throttle is slightly opened. The engine should accelerate smartly, and should attain at least its maximum road speed on about one-eighth of the full throttle opening. The auxiliary air valve should open, but not to its full extent, as the engine is not taking full charges. If it opens fully the spring is too weak, and its tension should be increased.

The second step is to try the car at moderate speeds on the road, and here the real process of adjusting begins. Let us suppose—what is likely to be the case—that the engine is sluggish. Without stopping the engine, try slight changes in the spray orifice or primary air inlet. First reduce, then increase the richness, and note the effect on the car's performance on level ground. An adjustment will presently be found with which the car runs well at ordinary speed. Now turn your attention to the auxiliary air valve, and bear in mind that you do not yet know that the mixture at ordinary speeds is correct; you may be driving with the throttle wider open than it should be. Note whether the radiator seems to heat on the level ground, also if there is a tendency to weakness and overheating on hills. These symptoms indicate that the mixture is too rich. Notice whether the auxiliary air valve opens sufficiently—that is, from $\frac{1}{8}$ to $\frac{1}{4}$ inch, depending on the size. Adjust the stop to increase the lift slightly, and slacken the spring. Remember, however, that a change in the spring tension has a greater proportional effect at low than at high speeds. This is very important. If easing the spring helps matters at medium but not at high speeds, note whether the auxiliary valve strikes the stop before the engine reaches its maximum. If so, the high speed mixture is too rich. If the construction is such that the valve can open further, adjust the stop accordingly. If, however, it flutters and behaves irregularly, the lift must be restricted. Increase the spring tension again and reduce the spray orifice. If there is no needle valve controlling the spray, reduce the primary opening so that a larger proportion of the total air stream will go through the auxiliary valve. These changes will weaken the mixture more at high than at low speeds, which is desired.

Suppose, on the other hand, that instead of overheating the motor was simply weak. It is a good guess that the mixture is too lean. Possibly the auxiliary valve spring is so weak that the valve opens fully at low speeds; or perhaps the lift is too great for the size of the engine. It is not usually difficult to modify the low-speed adjustment so that the car gives its maximum power and speed, and this should be the third step. There is less room for uncertainty here than about the low-speed adjustment, since unless the mixture is actually about right the maximum speed of the car will not be reached. A good test of the mixture is the response to the spark advance. If the mixture is bad the spark must be advanced considerably to produce any noticeable acceleration, whereas with the correct mixture any change in the advance is at once felt, and the maximum advance is not needed except at maximum speeds. Even more marked is the response to the throttle when the latter is nearly closed, and this is therefore the best low-speed test.

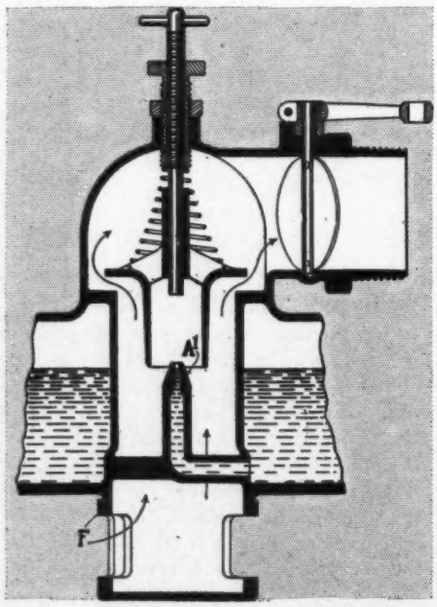



FIG. 1—ADJUSTABLE AIR INLET F

When the high speed adjustment has been found, the fourth step is to see whether the car will do equally well at ordinary speeds. If it does not one can generally tell whether the mixture is too rich or too lean by recalling what was done to make it correct at high speeds. For example, suppose the improvement at high speeds to have been obtained by increasing the auxiliary spring tension. This enriched the mixture at high speed, but enriched it more than proportionately at lower speeds as well. It is possible that the auxiliary spring is wound from too light wire or has too many turns, so that it is under too much initial tension, and therefore does not yield to the suction as soon as it should. Before changing the spring, however, try slackening it to its earlier adjustment, allowing the valve to open under moderate suction, and open the spray orifice slightly or reduce the primary air inlet. This will still give the desired mixture at high speeds, but will give a leaner mixture at low speeds. Suppose the mixture was found to be originally too rich at high speeds, and was corrected by slackening the spring or increasing the auxiliary valve lift. If the change was only in the lift the mixture at lower speeds has probably not been affected. If, however, the spring has been slackened, the mixture may be too lean at low speeds, owing to the air valve opening too soon. One way to correct it would be to use a spring having a larger number of coils, but a satisfactory result may usually be reached by increasing the spring tension and reducing the spray orifice.

Where the carbureter is of the puddle type the physical manifestations of rich or lean mixture will, of course, be the same as with other forms of carbureter. The puddle type, Fig. 3, however, has certain individual peculiarities, acquaintance with which will smooth the owner's way considerably. This type of carbureter differs from the spray type in having a U-shaped mixing chamber H in the base of which a puddle of gasoline about 3-32 inch deep is maintained by an annular float. As this puddle is supplied by gravity, a weaker

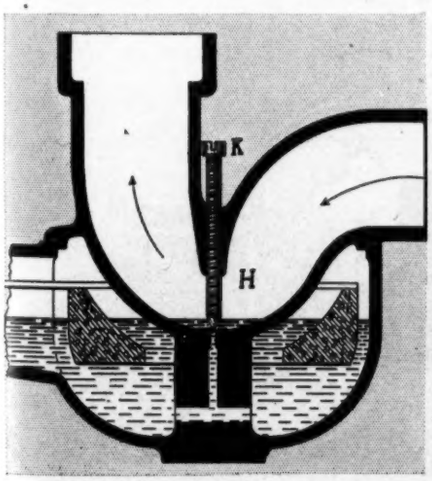



FIG. 3—PUDDLE TYPE OF CARBURETER

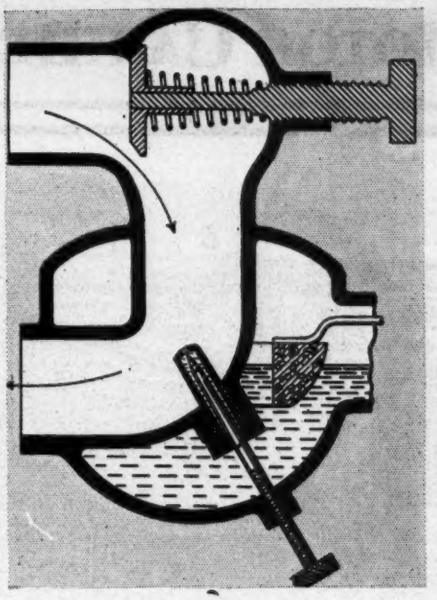


FIG. 2—VARIABLE AIR INLET

suction will produce a mixture richer than where the gasoline must be both lifted and atomized by suction. As the puddle is constantly supplied, it will evaporate continuously as long as the tank valve is open, and when the motor is not running it may produce a mixture too rich to ignite, particularly if the engine be hot. If the float valve be so high that flooding occurs, this effect will result very quickly. If, therefore, a carbureter of this type does not start the engine immediately on priming, the chances are that the mixture is too rich. The tank valve should be shut and a little gasoline drained from the float chamber, after which the motor will start easily. When the engine is shut down for a few minutes, the writer has found it a good rule to shut the tank valve at once, and to restart the engine before opening the tank valve.

This type of carbureter is very sensitive to changes, both in the float level and in the needle valve adjustment. A single turn of the screw adjustment of the float valve is equivalent to wiping out the puddle or doubling its depth. The easiest way to ascertain the correct adjustment is to connect up the carbureter with the intake in such a position that one can see the puddle, either directly or by a small mirror and electric flashlight. When approximately the right level has been obtained, further adjustment will be a matter of marking the float valve stem and turning its threaded adjustment not more than ⅛ inch turn at a time until the correct position has been found. If the float is too high the engine will be hard to start, and will accelerate badly, overheat and show poor power on hills. If once worked up to speed it may show excellent power. Partly closing the needle valve K will improve the power at medium speeds, but will reduce it somewhat at high speeds. If the float valve is too low the engine will start easily by priming but will develop poor power at ordinary speeds. If the needle valve is opened this may be partly corrected, but at the cost of excessive gasoline consumption at high speeds. Generally speaking, if the gasoline level is materially too low, the power developed will be poor at almost any speed, and it will probably be hard to run slow in high gear. When the correct float adjustment has been found, the needle valve must be very carefully adjusted. A sixteenth of a turn will make a vast difference in the power. Once properly adjusted, the engine will be very flexible and fast. It is well in general with puddle carbureters—and, indeed, with any others—to close the tank valve whenever the engine is stopped. A flooding carbureter may refuse to start the engine, but if the gasoline is shut off and the excess gasoline given time to evaporate, it may start very easily.

It is an excellent rule for the amateur not to try to rush an adjustment. His first impression of the nature of his trouble may on further trial be found quite wrong. When he gets a fairly good mixture it is best to drive the car a day or two, carefully noting its behavior, giving opportunity for the finer symptoms to show themselves, and giving himself time to analyze them critically before he attempts changes. If changes must be made on the road—other than in time expressly selected for that purpose—it is well to limit them to simple changes in needle valve adjustment. These will give the correct mixture only within narrow limits of speed, but by judicious trials one may learn what changes in mixture—whether richer or leaner—are demanded for different speeds; and this information will help immensely when the time comes to attack the auxiliary air valve or float level adjustments.

And—once more—remember that whatever change you make in the auxiliary valve spring tension, that change will produce its greatest relative effect at moderate speeds; its least relative effect at high speeds. The same is true of the float level in the puddle type.

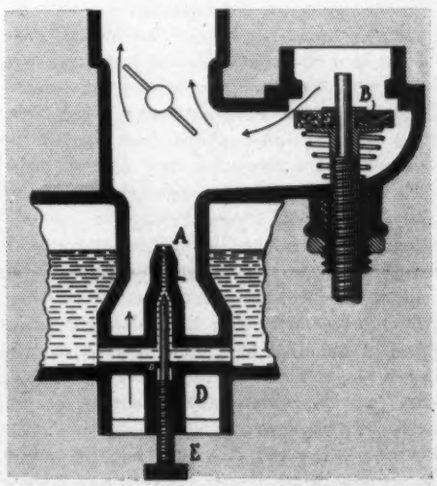



FIG. 4—AUXILIARY TYPE AIR VALVE

# FIELD OF MOTOR CAR DEVELOPMENT

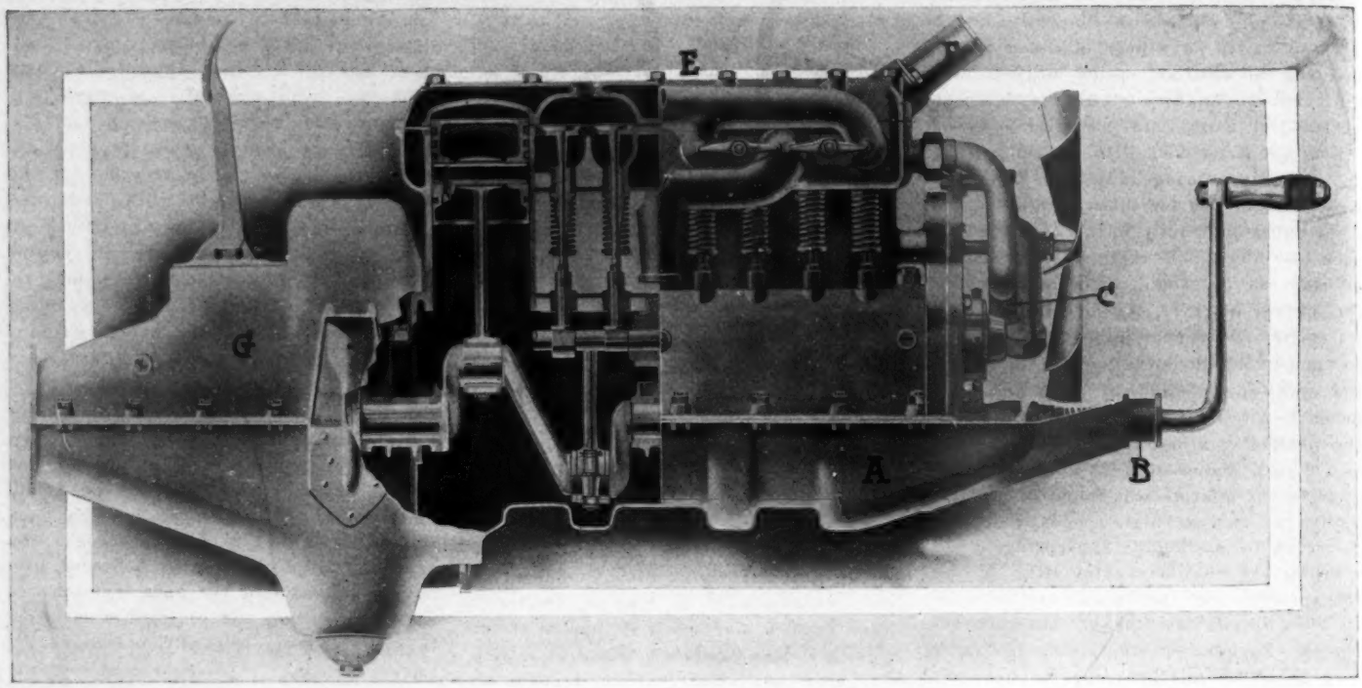



FIG. 1—FORD MODEL T UNIT POWER PLANT NEW CAR

AFTER 3 years of experience in the manufacture of a low-priced four-cylinder car, during which time 20,000 of them were manufactured, the Ford Motor Co., Detroit, Mich., announces that on October 1 it will begin delivery of its model T five-passenger touring car, which will be turned out at the rate of 100 per day after that date. This new car, repiete with innovations which have been tried out during the last 9 months, combines in its make-up features heretofore untried in motor car engineering, all of which are introduced with the aim of building a light-weight machine, capable of irregular road conditions as encountered in America, and possessing reliability features equal to the demands of motorists.

In an introductory resume of the car, which is a 20-horsepower machine with 100-inch wheelbase and weighing 1,200 pounds, a few of the cardinal innovations are: The four cylinders with the top of the crankcase are formed in one casting; there is a separate one-piece waterjacketed head casting for all four cylinders; ignition current is furnished by a low-tension generator incorporated in the flywheel of the motor; the flywheel of the motor becomes the lubricator in that it is enclosed, operates in an oiled bath, and distributes the oil through a lead to the motor crankcase; the improved planetary transmission has some of the planetary gears carried on the flywheel; the car has but two springs—a transverse semi-elliptic in front and a similar one in the rear; the lower half of the crankcase is continued to the rear, forming a housing for the flywheel as well as constituting the lower half of the transmission case, and a protection for the universal joint at the rear of the transmission, thereby eliminates the necessity of the mud apron. Last but not least must be mentioned the left-hand control, in which the steering wheel, control levers, and pedals are on the left side, a design particularly suited for American road conditions, where vehicles, traveling in opposite directions, pass on the right.

These are the innovations. Hand in hand with these, go the unit, motor and transmission construction, now employed on Ford cars for 4 years; the three-point suspension of this; the peculiar triangular Ford drive; and the employment of Vanadium steel in axles, springs, motor shafts, transmission parts, real axle driving parts, frame brackets, and all parts of the car. To insure freedom from trouble, castellated nuts are used everywhere.

**The Unit Power Plant**

In Fig. 1 appears the unit power plant, with the one-piece casting forming the four cylinder walls with waterjackets, as well as the top half of the crankcase. The lower half of the crank case as stamped casing A, which is continued to the rear, as already stated, forming the lower half of the transmission case as well as the flywheel housing. The upper half of the transmission case G, carries an enclosure for the top half of the flywheel.

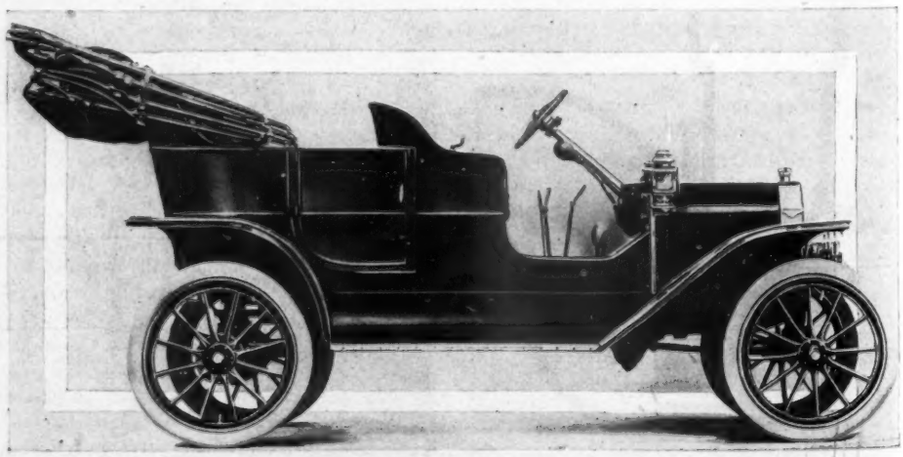


FIG. 2—FORD MODEL T LEFT SIDE CONTROL CAR

# THE FORD MODEL T CAR FOR 1909

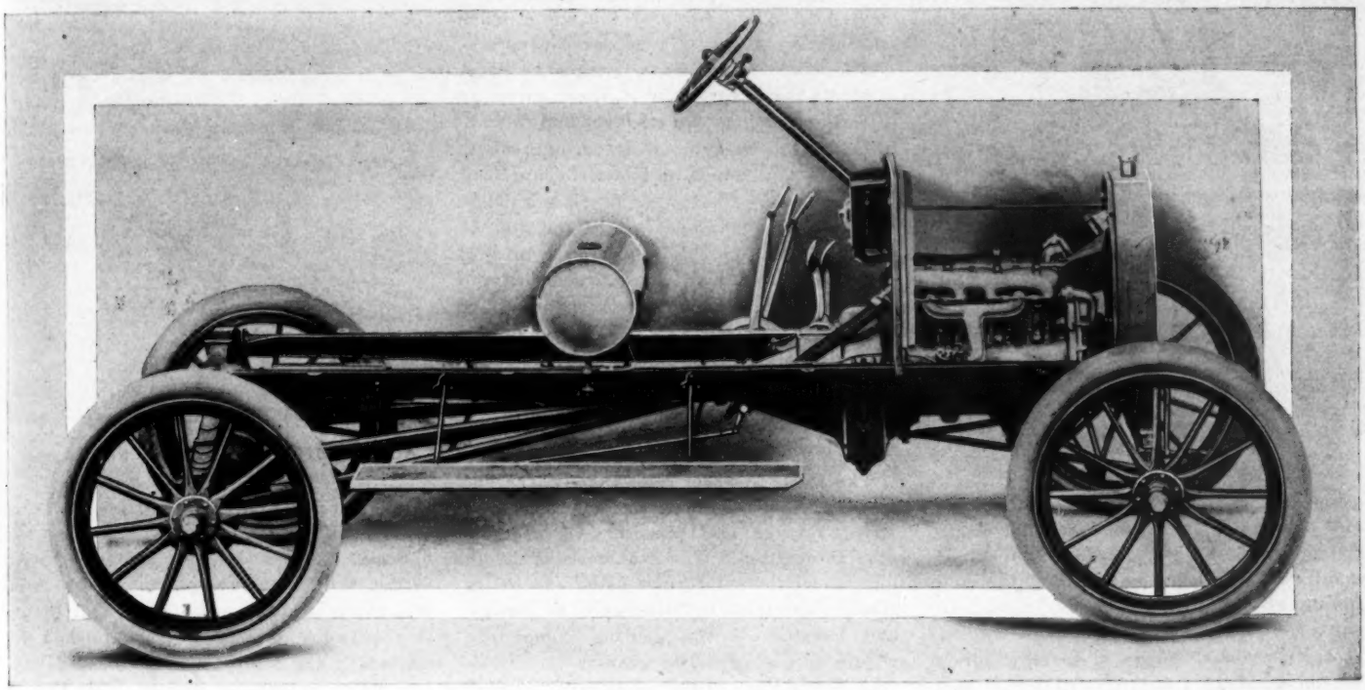


FIG. 3—FORD CHASSIS WITH FOUR CYLINDERS IN ONE CASTING

The waterjacketed cylinder head E, for the four cylinders, has one exit water passage F to the top of the radiator. With this cylinder head removed, the tops of the four pistons, as well as the eight valves, are exposed. This headpiece is attached by a goodly number of vertical bolts and between it and the cylinder jackets proper is a large asbestos-metal gasket. Using a headpiece of this nature makes the unit cylinder casting a particularly simple affair, free from intricate coreways and one which can be machined and reamed with the greatest facility. Intake and exhaust valves, carried on the right side, are located in the offset valve compartments and are opened from a single camshaft enclosed in the crankcase and carrying eight integral cams. Grouped at the forward end of the motor are the timer D on the end of the camshaft, the water pump C, and the fan, both on the same shaft and gear-driven from the half-time shaft. The motor, externally viewed, is an exceptionally clean-cut affair, there being nothing on the left side and only the intake and exhaust manifolds with both sets of valves and carbureter on the right side. Incorporating the oiler and magneto in the flywheel greatly assist in this simplification role, as does the simplification of the water piping, consisting, as it does, of a short pipe from the pump C to the front end of the waterjacket space and a short return pipe F from the cylinder head piece to the top of the radiator. Within the jackets are partitions which necessitate a complete circulation of the water around all of the cylinders and cylinder heads. A vertical tube radiator is used. The motor finds its three-point support in the forward one on the trunnion at the point B, which takes support in the transverse channel member of the frame directly over the center of the spring, and the two rear supports in line with the flywheel which are direct on the side members of the frame. The front axle is braced by a triangular system, the apex a ball-and-socket attachment beneath the motor bed and the ends rigidly secured to the axle ends.

**The Flywheel Magneto**

In the jump spark ignition system what is known as a low-tension magneto generator is located and incorporated with the flywheel, which magneto is without brushes, contact points, moving contact, moving wires, gearing, and the many other parts associated with different types of magnetos. It consists of sixteen V-shaped magnets, carried on and distributed regularly around the flywheel periphery, with the apex of them towards the center, all giving the appearance of a coarse-tooth circular saw. The two south poles of the magnets come together as do the two north poles and these radially concide with the windings. Located on a stationary spider, immediately between the vertical plane of the magnets and the crankcase, are sixteen coil windings, alternated right and left, so that as the north and south poles of the magnets pass these right and left windings respectively, a continuous current is set up in the windings which is transferred to the timer, or

**SPECIFICATIONS OF FORD MODEL T TOURING CAR**

Horsepower A. L. A. M., 22.5
Cylinder diameter, 3¼ inches
Piston stroke, 4 inches
Wheelbase, 100 inches
Capacity, five-passenger
Weight, 1,200 pounds
Cylinders, four in one casing
Ignition, magneto generator of 16 magnets and 16 coils in fly wheel
Lubrication, centrifugal force of fly wheel supplies oil leads to motor
Transmission, two speed and reverse planetary carried on fly wheel
Drive, Ford triangular with enclosed propellor shaft
Rear axle, no truss-rod, Hyatt outer bearings, plain differential bearings
Steering, Ford type with adjustable tie-rod
Cooling, gear-driven pump in rear of radiator
Brakes, band on transmission expanding on rear axle
Control, all parts on left side of car
Tires, 30 by 3½ and 3 inches
Gasoline, 10 gallons
Tread, 56 inches
Springs, transverse semi-elliptic front and rear
Carbureter, new Ford design

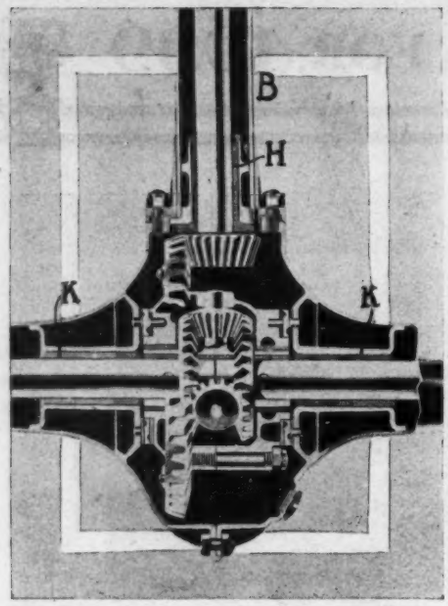



FIG. 4—FORD DIFFERENTIAL

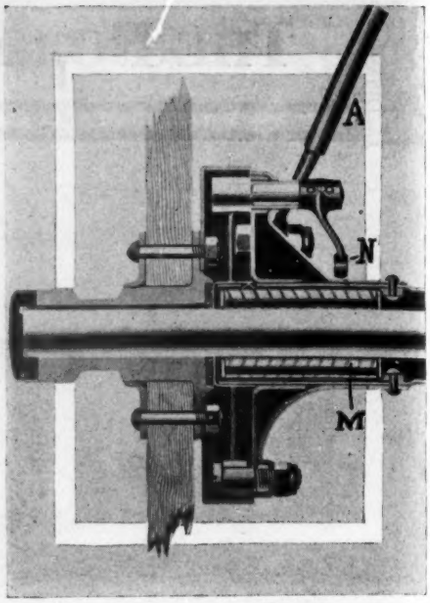



FIG. 5—HYATT BEARINGS IN REAR AXLE

commutator, through one wire, thence to the four-unit coil on the dash, and thence to the spark plugs. There is no supplementary battery system; in fact, the magneto, an integral part of the motor, insures an ignition current whenever the motor operates. The sixteen windings in the flywheel are joined in series with one end grounded and the other end connected to the timer.

In the Ford model T touring car, the flywheel is the most important element, combining in its make-up lubricator, magneto and planetary gearset. In its lubricating role, it splashes the oil by centrifugal action into a pocket on the partition between the flywheel compartment and the crankcase, and from this oil pocket the lubricant is conducted in a slanting duct to the front end of the crankcase where it supplies the splash system. The angle of this oil tube is such that the lubricant will flow to the front of the motor when the car is ascending a 23 per cent grade. Within the motor is a complete splash system, the lower ends of the connecting rods dipping into the oil level and distributing it to the cylinder walls, crankshaft bearings and upper and lower connecting rod bearings. The oil supply is furnished through a square opening in the top of the transmission case, illustrated in Fig. 1, and additional oil can be furnished the crankcase at the forward end through a compression release, not appearing in the same illustration. A feature of this oiling system is that the same grade of oil is used for the transmission and motor.

**The Flywheel Transmission**

The third flywheel role, namely, that of incorporating within it parts of the two-speed reverse and planetary gearset, is also interesting. The transmission is an improvement over former ones, due to its silence obtained by difference in design and housing of the gearing completely within a casing. The gearset is of the spur planetary type without internal gears. Three planetary pinions are carried on the flywheel, which result in a reduction of weight. The high-speed clutch is a multiple-disk affair, located at the rear, and engaged by a short coil spring, the tension of which is transferred direct to the alternate set of steel disks through three radially positioned arms. The low-speed and reverse clutches are fiber-lined steel bands, provided with spring reliefs removing the bands from the drums when not in use. The reduction in noise is largely accomplished by increasing the size of the gears, and having them externally driven. In Fig. 8 low speed and direct drive are obtained by pedal 2 and reverse by lever 3. Pedal 1 operates the transmission brake and lever 4 the expanding metal-to-metal brakes on the rear wheels. The unique feature of the control, however, is this: Pushing the reverse lever 3, Fig. 8, for-

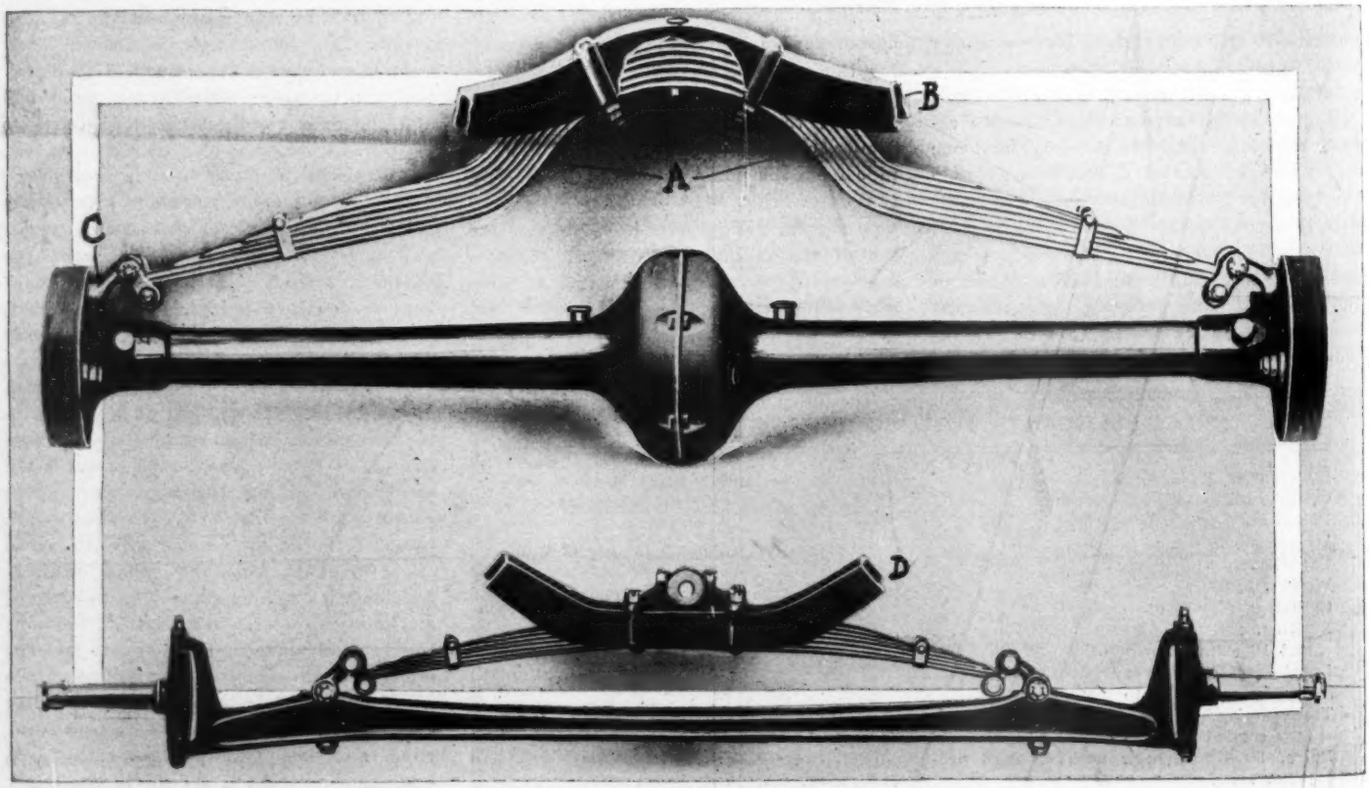
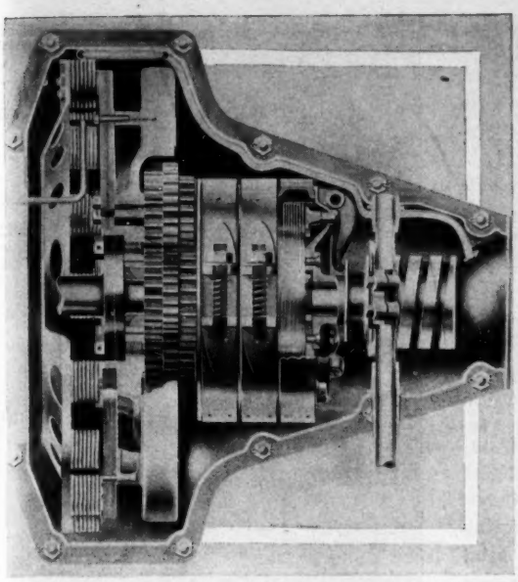



FIG. 6—FORD TRANSVERSE SPRINGS LOCATED OVER FRONT AND REAR AXLE



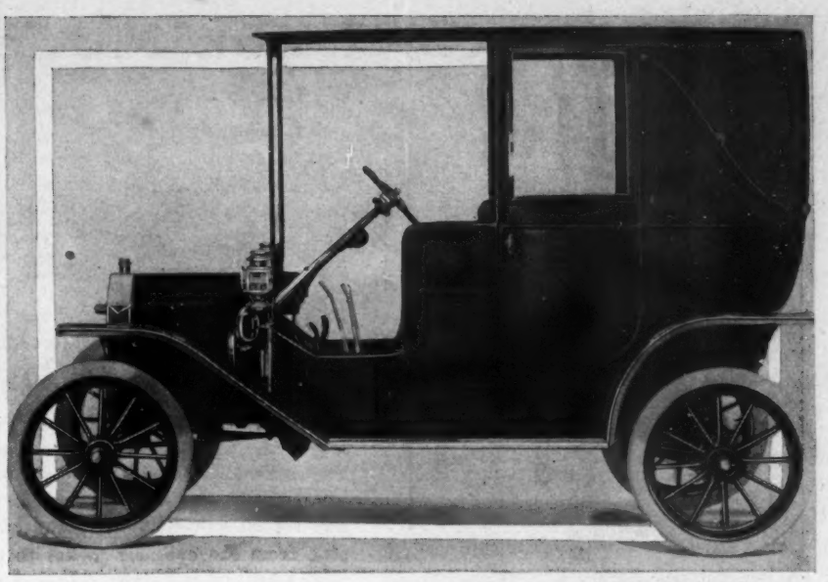


FIG. 7—FORD TRANSMISSION AND FLYWHEEL MAGNETO AND LANDAULET BODY

ward, locks the high-speed clutch, at which time the pedal 2 is in neutral position, which allows the engine to run with the car stationary; this done, a forward pressure on pedal 2 engages low speed, and as soon as the car has picked up enough, releasing the pedal 2 entirely brings direct drive. Should the driver want to slow up any place he controls the car entirely through pedal 2, putting it either in neutral or slow speed ahead position, and releasing it, giving direct drive. In this way the left hand control is greatly simplified.

**Ford Triangular Drive**

From the transmission drive to the rear axle is through an enclosed driveshaft, with universal joint at its forward end, the exact construction of which is shown in Fig. 9, in which F shows the squared coupling of the joint with the transmission, E the universal joint and C the globe housing secured to the end of the propellor shaft casing B. The globe housing C finds support in a socket on the unit power plant. The brace rods A diverge and connect rigidly with the ends of the rear axle housings, so that the rear axle drives through them these, in turn, transmitting to the unit power plant which is carried direct on the side members of the frame. In Fig. 4 is shown the bevel gear construction, changed this year by the employment of bushing K, on which the inner ends of the axle driveshafts are carried, these bushings preventing the leaking of grease from the differential. The outer ends of the axle driveshaft, as shown in Fig. 5, are carried on Hyatt roller bearings M. Particularly conspicuous in the rear axle, as shown in Fig. 6, is the elimination of a truss-rod and making the axle housing out of two drawn steel trumpet-shaped members, the flared inner ends enclosing the differential. The transverse rear spring A shackles at each end to arm C, carried on the disk, or brake carrier, and because of supporting the car weight so near to the rear wheels, the truss-rod has been deemed unnecessary.

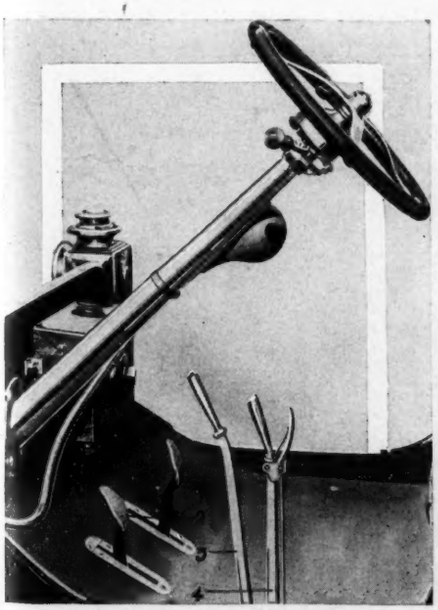


FIG. 8—LEFT SIDE CONTROL PARTS

**The Running Gear**

The care with which all running gear parts are made is evidenced by the use of castellated nuts everywhere. The steering gear, of the regular Ford type, is carried on the column immediately beneath the steering wheel. On the steering wheel axle is a pinion in mesh with a set of three planetary pinions which also mesh with an internal gear in the steering column housing, the construction being very much like a half differential. Frame members are made straight from end to end with a goodly center taper. Thirty-inch wheels carry 3 and 3½-inch tires, a hinged bonnet is used, the starting crank supporter is done away with; between the running board and the body is a mud flap, and many other refinements exist. The car will be manufactured in touring car, runabout, coupe, taxicab, and other styles.

A change in the control parts is locating the throttle leverette under the right side of the steering wheel where it can be controlled by the fingers of the right hand, thus leaving the left hand free for the working of the reverse and emergency brake levers. The front wheels are carried on cup-and-cone ball bearings, the front axle carries Elliott jaw ends, and the rod is in the rear of the axle.

## MOTOR CAR LITERATURE

The 1909 Packard catalog is, with the exception of three pages, an illustrated de luxe edition, devoting a page to illustrating each of the several models, and on other pages showing factory and office scenes. The usual motor, transmission and other car part illustrations are wanting. A two-page description of the car is given and a page of prices added. Between the double covers is a bird's-eye view of the factory, with border formed of the different Packard models.

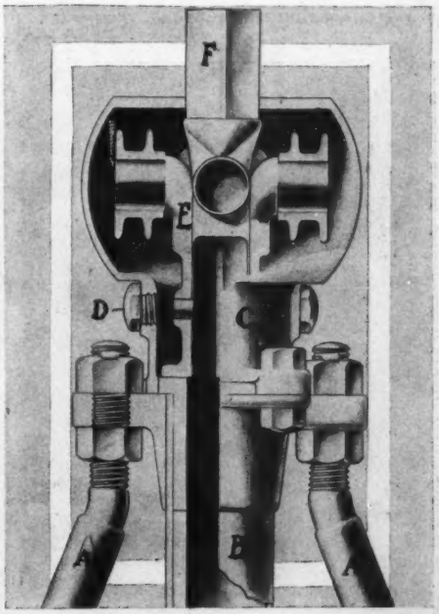



FIG. 9—FRONT END OF DRIVE SHAFT

# Three 1909 Knox Models

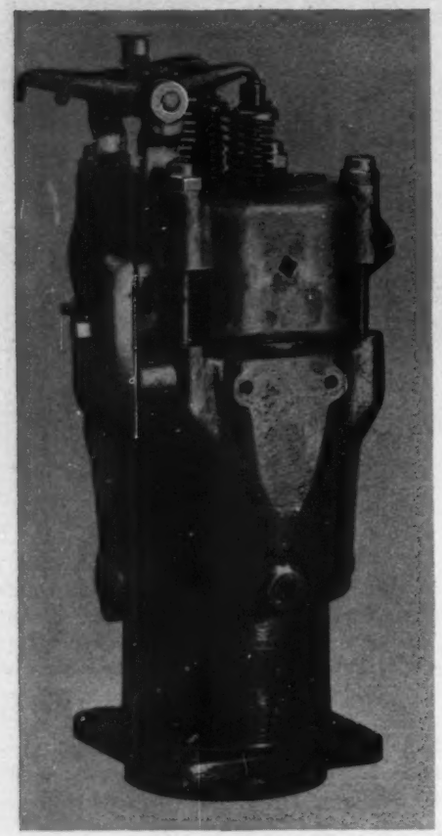


FIG. 1—ASSEMBLED CYLINDER

THERE will be three Knoxes for 1909, two water-cooled models and one air-cooled, the latter being for those preferring this type of motor construction. The following description applies to water-cooled types only, which are known respectively as models O and M—O a 38-horsepower shaft-driven car with a motor, clutch and transmission, in a unit construction carried on a three-point support; whereas, model M, a 48-horsepower car, using separate motor and transmission units but carrying each on a three-point suspension, it being also a chain-driven machine. Both model O and M will carry 1909 improvements in the matter of a three-disk clutch, replacing the cone-driven type heretofore employed, and a modification of the intake and exhaust, as well as the intake and return water pipes of the motor. The changes in this piping greatly simplifies the work of taking off the cylinder head, this being a separate part of cylinder casting in Knox construction. With the improvement, the intake and exhaust manifolds are carried on the left side and attached by T-yoke with stud to each cylinder. The return water pipe and the connecting pipe from the cylinder jacket to the head jacket are on the right side and attached by T yoke, so that loosening of the studs for the two yokes and taking off the nuts on the four studs holding the cylinder head in place, permits of removing the head for valve grinding or replacing.

In the model M chain-driven car a noted change is the employment of a new style crankcase of the one-piece type Fig. 4, in which in the front end A is a removable plate and along the bottom is a detachable plate B to the lower end of which is the oil reservoir C. This new form of a crankcase has a three-point support, the front end being suspended from a channel crosspiece 1, the ends of which are carried on the side members of the frame. The rear end finds support in a pair of support arms, 2, attached to the sides of the case.

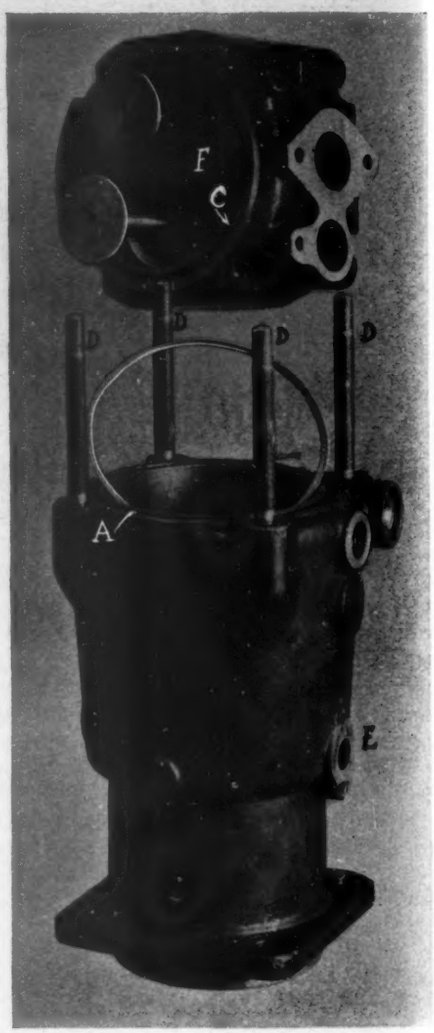



FIG. 2—CYLINDER HEAD OFF

### Cylinder Construction

The Knox cylinder design, having intake and exhaust valves in the cylinder heads and using a separate casting for the cylinder head in order to waterjacket it more properly, results in a construction unique in American motor cars. The cylinder casting proper, with its integral waterjacket, has in its upper face a deep groove A Fig. 2 machined concentrically with the bore into which fits a copper asbestos gasket; in the cylinder head face is machined a circular tongue C, which fits into the groove above the gas-

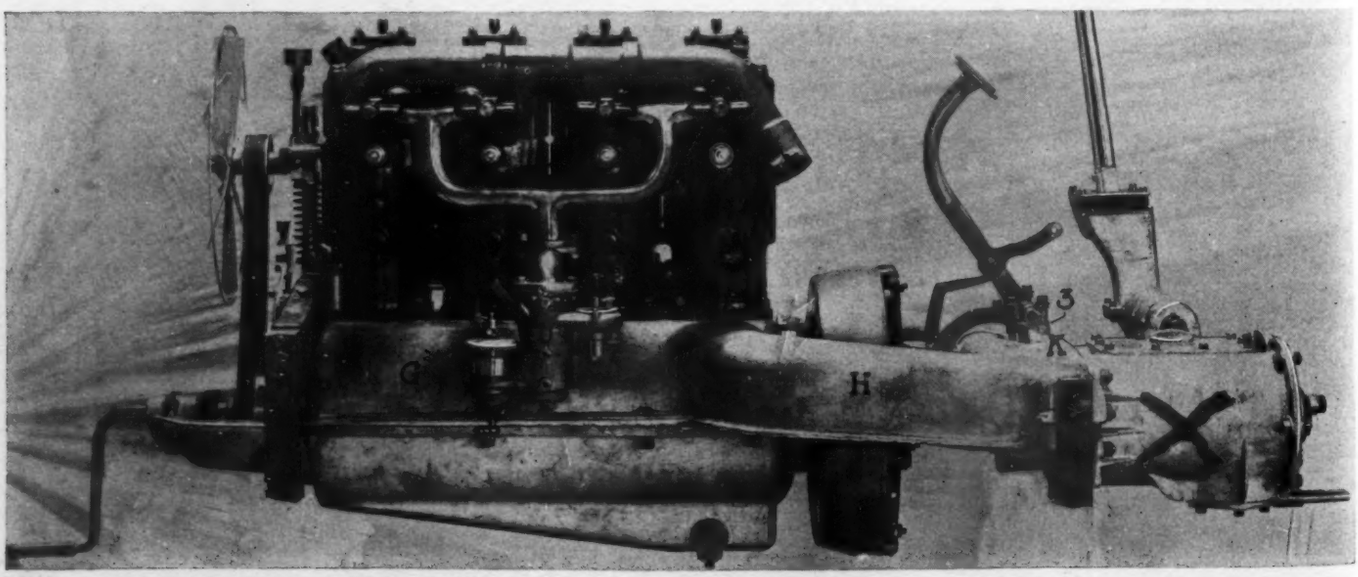



FIG. 3—KNOX UNIT POWER PLANT AND NEW MANIFOLD SYSTEM ATTACHED BY T YOKES WITH CENTER BOLT

ket. Four vertical bolts D, which pass directly through the head, hold the two parts together. The water circulation, which enters the cylinder jacket space at the bottom E is continued to the jacketing of the head through a short tubular connecting link, in the form of a bridge casting, and the return flow is from the jacket parts of the head to the radiator top. Using a construction of this nature allows of a perfectly symmetrical combustion chamber equal in diameter to the bore of the cylinder. The cylinder part being open at both ends permits of the greatest care in machining. The bottom of the cylinder head F is also machined so the entire surface of the combustion chamber is smooth, and the capacity of the combustion chambers of the four cylinders as accurate as is obtainable. The maker claims that the smooth combustion surface is less likely to retain deposits of carbon, and its freedom from short points or rough edges should eliminate preignition troubles. Using the separate cylinder head results in the obtaining of particularly large water spaces around both valve seats, and circulation is additionally insured through the head by the use of a horizontal partition, giving in reality two water spaces, so that the water must flow directly over the valve seats. The connection of the water pipes is such that a positive circulation through the entire head is imperative. This type of cylinder casting is used on both models M and O.

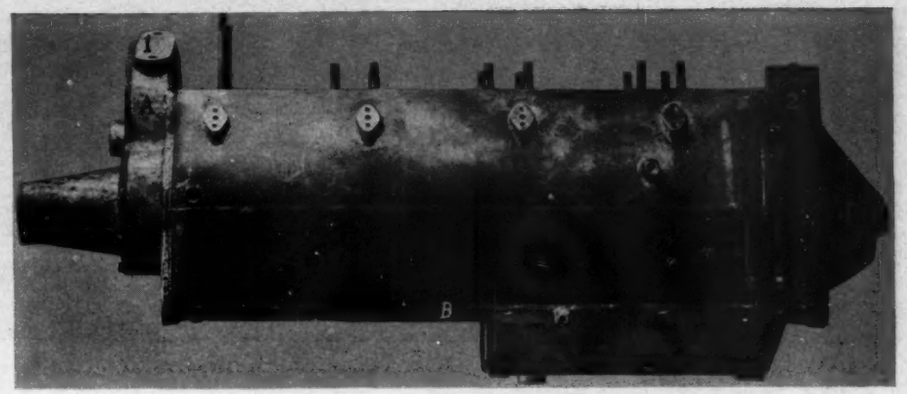



FIG. 4—ONE-PIECE CRANKCASE USED IN MODEL M KNOX

**Three-Point Suspension**

In model O the company continues the use of a unit power plant and the three-point suspension, which is accomplished as follows: The upper half of the crankcase G, Fig. 3, is formed with rearwardly extending arms H, which encircle the flywheel and have their ends united by an integral transverse part K, to which the front end of the transmission bolts, thereby uniting in one, for support purposes, the motor, clutch and gearset. This unit has its three-point support by a trunnion I at the forward end supported on a channel cross member, the ends of which repose on the frame pieces. The rear supports 2 and 3 are directly on brackets on the side members of the frame, which brackets are lower than the frame members in order to affect a straight line drive from the crankshaft to the rear axle. The motor support casting attaches to each side bracket through a transverse bolt, which would give a hinge action should the frame sag allowing the front end of the motor to rise or fall.

**The Water-Cooled Motor**

According to A. L. A. M. rating, the model O motor is 38.025-horsepower, its cylinders having a bore of 4⅞ inches and 4¾ inch stroke, the bore having been increased ½ inch over the 1908 size. Altering the piping system makes it a more symmetrical unit, having the intake and exhaust gas manifolds and the battery plugs on the left, and the intake W and return water piping W1 together with the short bridge pipes W2 between the cylinders and the heads on the right. On this side, also, are located the high-tension magneto, towards the front, and the three-part group of oiler, timer, and water pump at the rear. The crankshaft is a nickel steel forging, $1\frac{3}{16}$-inch diameter carried on five bearings, a 4-inch one at the flywheel end, and 2½-inch ones at the other points. Babbitted alloy bushings are used in all. Connecting rods are nickel steel forgings with the heads attached by four bolts, secured by double lock nuts. Intake and exhaust valves are made with integral head and stem and have the stems lubricated by carrying them through a gland. The usual rocker arm construction over the cylinder head is employed for opening the valves. The upper ends of the push rods carry cup-shaped sockets to engage the ball endings on the rocker arms, and the use of oils in these pockets eliminates wear. In the push rods at the side are nut and lock nut methods of adjustments for the timing of the valves.

**Lubricating System**

The Knox oiling system is an evolution of the de Dion type which has found many followers in America. It is a positive feed system without the usual splash in the crankcase. At the right rear of the motor, and carried outside of the crankcase, is a gear oil pump driven by vertical shaft from the camshaft. This pump draws oil from a reservoir formed

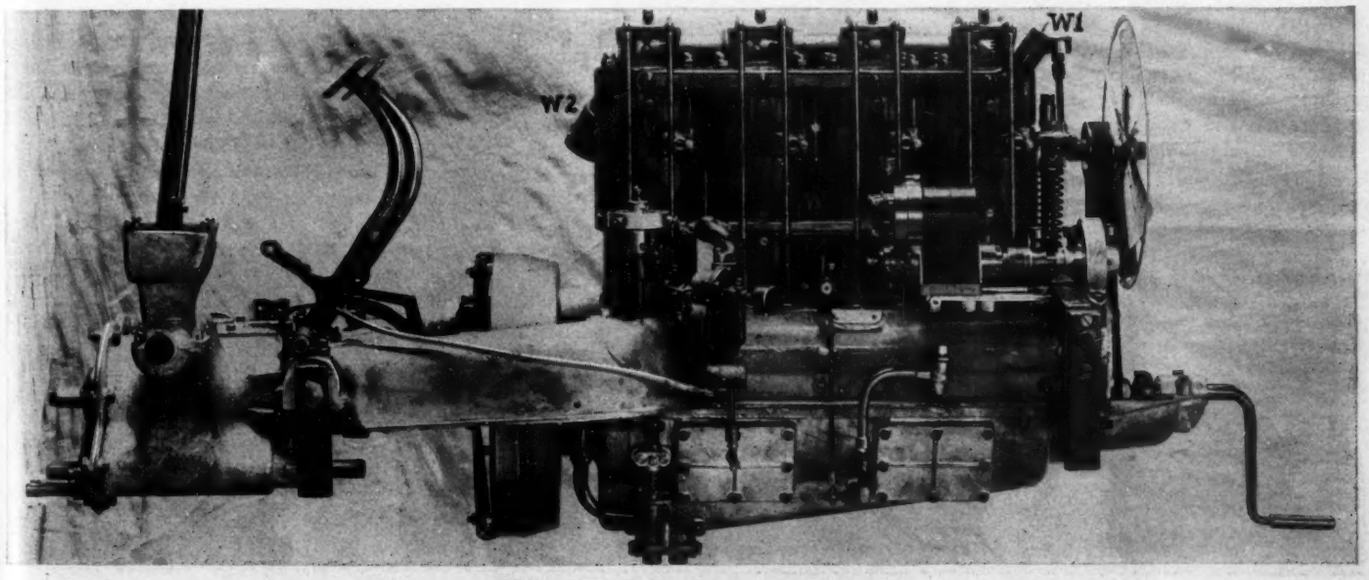
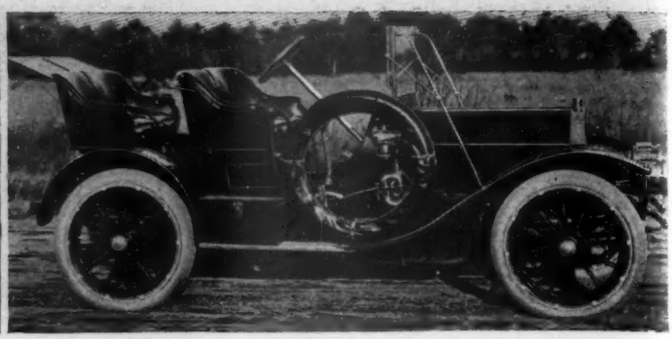



FIG. 5—WATER PIPE W, RETURN PIPE W1 AND HEAD CONNECTOR PIPE W2, THE LATTER TWO YOKE ATTACHED



KNOX MODEL O 1909 TOURING CAR IN BABY TONNEAU AND SPORTABOUT STYLES

in the lower portion of the under half of the crankcase. The lubricant, drawn through a strainer, passes through a tubing which rises between the end of the crankcase and the flywheel to a level with the top half of the crankcase, whence it enters a horizontal duct drilled in a boss on the side of the upper half of the crankcase. From this duct are five branches to the five bearings of the crankshaft. Drilling the crankshaft in the usual manner conveys the oil, thus fed, to the lower bearings of the connecting rods, and drilling the connecting rods to the upper ends allows of forcing the oil to the wristpin bearings, thus insuring a positive lubrication to the thirteen motor bearings. The overflow from these bearings returns to the oil reservoir, that from the wristpins being distributed over the cylinder walls. On the other side of the crankcase is a by-pass from the main oil duct back to the reservoir, and in this is a pressure gauge by which excess of oil above a certain determined pressure is returned to the reservoir before reaching any of the bearings.

**Double Ignition System**

The double ignition system incorporates a gear-driven high-tension magneto with wires communicating direct to the plugs carried on that side of the motor. The supplementary system consists of a battery and Connecticut coil and timer, the timer on a short vertical shaft driven by spiral gear from the camshaft. The spark plugs for this system are on the left side. Both systems are entirely independent.

**Carburation and Cooling**

After considerable experimenting the company has finally adopted the Stromberg carbureter for the coming season, which carbureter is characterized by the transparent float chamber, spring controlled auxiliary air valve, and copiously waterjacketed mixing chamber. In the cooling system the pump maintains its unique position at the right rear, where it is driven by spiral gear from the timer shaft. It delivers the water through a tapered manifold to the base of the water jackets.

**Transmission Improvement**

Carried within a recess in the flywheel is the new three-disk clutch, used for the first time, and which operates in oil. The middle disk contains cork inserts and connects with the transmission through its shaft; whereas, the two outside disks attach to the flywheel. In the model O car the three-speed selective gearset is employed. Chrome nickel steel gears are employed; both shafts are carried on ball bearings with a double ball race at the end of each shaft, one acting as a thrust bearing and one a radial bearing. In this model, as previously stated, the gearbox and cover are bolted to the rear end of the engine bed and are removable by withdrawing the connecting bolts; but, in addition to this, the gears and shafts may be removed without disturbing the gearbox or any other part of the power plant. The gearbox casting carries an extension enclosing the shifting rods for the speed changes.

**Running Gear**

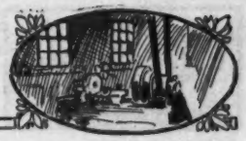
Employed in this model is a tubular front axle with tie rod located in rear of it; the steering knuckles are forgings with heavy yokes on the axle end. Hyatt roller bearings are employed in the rear axle with ball races for taking the end thrust and two annular bearings for supporting the pinion shaft at the rear end of the propellorshaft. The steering column is of the screw and nut type, the screw formed integral with the column and cut from a solid bar. Use is made of a particularly long nut, in which the sides of the thread are inclined. Both sets of brakes are carried on the rear wheels. The lever emergencies are expanding numbers and the foot brakes a contracting band. Asbestos fiber is the friction material. Semi-elliptic springs are used throughout, the rear set being shackled at both ends. In connection with this double shackling is the employment of radius rods and the elimination of the torsion rod, the car being driven through the radius rods only. The usual control members are employed. Thirty-four by 4-inch tires are used, the wheelbase measures 114 inches, and the weight approximates 2850 pounds with equipment and five-passenger body. Model O is made in touring car, limousine, baby tonneau and sportabout styles.

**The Model M Car**

The model M car, with seven-passenger capacity, has a 48-horsepower A. L. A. M. motor, with 5¾-inch bore and 5½-inch stroke. Attention has already been invited to its one-piece crankcase. It employs the three-disk clutch, but uses a Mercedes type selective transmission with four forward variations and employs side chain drive. In other respects it is except for size a counterpart of the model O car. In touring car lines, its wheelbase measures 127 inches and use is made of 36 by 4½ and 5-inch tires. Like the model O car, it is manufactured in limousine, landaulet and sportabout styles as well as touring car.

MODEL M, SEVEN PASSENGERS — TWO 1909 KNOX TOURING CARS — MODEL O, FIVE PASSENGERS

# Motor Car Shop Kinks



## Aids for the Amateur

### OILS FOR GEARBOX AND AXLE

IF the gearbox and rear axle have plain bearings, the oil must be considerably thinner than if ball bearings are employed. The reason for this is two-fold. A fluid oil allows the grit from the gears a chance to settle, and it enters the bearings more freely than a semi-solid lubricant would. For plain bearings, regular gearcase oil is about right in warm weather, especially as it is thinned somewhat by the warmth received from the engine and exhaust pipe. In cold weather it may be necessary to thin the oil with kerosene to induce it to flow at all. If, however, ball bearings are used, or if the bearings are plain but are separately lubricated, including the telescope bearing at the end of the sliding gear shaft, it will be safe to add a double handful or so of grease to the gear case oil, leaving it just soft enough to flow slightly when warm.

### STIFF AND WEAK VALVE SPRINGS

Stiff valve springs may close the valves with so much force as to break the heads from the stems, or they may break the stems at the key slots. Springs too weak to hold the valves on the cams will make the engine weak at high speeds, and will produce clattering owing to belated seating of the valves. If the springs are too stiff, and are shortened, the cut ends must be turned flat, which necessitates heating them in a fire and afterwards retempering.

### CLEANING CRANKCASE

About once in 1,000 to 3,000 miles, depending on the quality of oil used, the crankcase should be emptied and a fresh supply of oil introduced. This is an excellent time to clean the pistons and engine interior generally with kerosene. It is assumed that a spoonful of kerosene has been squirted into the cylinders regularly after each day's run; nevertheless there will still be some accumulated carbon about the rings. Immediately on finishing a run, first unscrew the drainage plugs in the oil pan and draw off all the oil. If fairly clean, this oil can be filtered and used in the gearbox. Next, the caps over the valves are removed and a cupful of kerosense is poured into each cylinder. The crank is turned slowly by hand until this works past the rings, after which a couple of spoonfuls of cylinder oil are squirted on each piston and the crank again turned until the oil has worked down. Now pour kerosene through the "breathers" in the crankcase up to the normal level of the oil. Start the engine and run it 2 or 3 minutes, thereby splashing the kerosene thoroughly about the crankcase and valve mechanism. Stop the engine and draw off the kerosene, which will carry with it a considerable accumulation of dirt and metal dust from the bearings. Refill the crankcase with clean oil and run the engine again—without load—for a few minutes to insure that the oil is splashed to all bearings needing it. It is now safe to run the engine under load.

### TIRES ON SECOND-HAND CARS

A car marketed at a close figure is very apt to have tires barely up to the requirements of the tire manufacturers' guarantee. Such tires suffer from rim cuts and blow outs much more than tires a trifle larger, since the small tires have to be pumped quite hard, and even then flatten more under load than larger tires under like conditions. In purchasing a second-hand car it is well to consider the matter of tires somewhat carefully, and to figure on substituting larger tires if those used are under suspicion. A safe rule is to have the tires ½-inch in section for each 100 pounds of total load, including passengers and supplies. For example, a 3½-inch tire should not carry over 700 pounds maximum. The tire makers have brought out two odd sizes of tires especially to take the place of smaller sizes without change of rim. These are the 31 by 4 and the 33 by 4-inch sizes. The 31 by 4 size will go on a 30 by 3½-inch rim, and the 33 by 4 on a 32 by 3½-inch rim, without changing the rim. Occasionally one finds a 34 by 3½-inch tire which is too heavily loaded. Here one's best hope is that the felloe can be cut down for a 34 by 4-inch rim without seriously weakening it.

### TESTING OIL AND GREASE CUPS

The oil and grease cups on joints of the steering gear, springs, and other small bearings scattered about the car easily become clogged. It is not sufficient to see that the oil cup is filled with oil or that the grease cup is screwed down as far as it will go. Unless the oil actually runs in and the grease cup is observed to be slack after running, it is clear that the bearing is not receiving lubricant, and the best thing to do is either to force kerosene in, or, better, to take the bearing apart if possible, and clean out the solid particles with which the oil passages are probably clogged.

### QUICKLY LOCATES A KNOCK

Tracing a knock is sometimes a puzzling job. It may be in one of the main bearings of the engine, in the camshaft bearings, in a loose valve lifter, in a loose camshaft gear key, in a loose pump or magneto drive coupling, an unsuspected loose bolt between two parts supposed to be fast, or in any of a dozen or score of other unsuspected places. A valuable aid in locating a mysterious knock is a flexible speaking tube such as is used with phonographs. One end of such a tube can be held to the ear and the other moved about from point to point until the exact spot is found where the noise is loudest. Another aid is a light bar of iron, one end of which is pressed against the part where the knock is suspected and the other touched to the forehead or the teeth, when the sound is clearly transmitted.

### POSSIBLE CARBURETER TROUBLE

In case the motor fails to start readily on priming the carbureter, and the mixture is found to be over rich, it may be that the drainage hole in the carbureter is clogged so that the overflowing gasoline accumulates and makes too rich a mixture. This, of course, does not apply to carbureters in which the overflow of gasoline dries out on the ground without depending on a drainage outlet.

### DRAINING GEARBOX AND AXLE

It is a familiar fact that the gearbox requires to be periodically emptied of oil and the accumulated metal grit washed out before fresh oil is supplied. The same is true of the rear live axle casing, except that the gears in the axle do not clash and therefore do not wear out as fast as the change speed gears. At least once in a season the oil in the rear axle should be drained out, a liberal supply of kerosene introduced, and one axle jacked up while the engine is run to agitate the oil and wash out the differential, etc.

### SAFE AND UNSAFE DUST PANS

Drain outlets should always be provided at the lowest point of the dust pan and at the bottom of any "pockets" it may contain. If this is done, gasoline accidentally finding its way into a pocket will not remain, and there will be no danger of its catching fire.

### DRIVING A BOLT HOME

When a bolt on which a nut is to be screwed sticks before it is fully introduced in its place, do not attempt to force it home by tightening on the nut. Drive on the bolt head with a hammer while the nut is being tightened, and strain on the bolt will be avoided.

# From the Four Winds

N S E W

**Children Given Ride**—Several hundred children living in a certain section of the west side, Buffalo, were given motor car rides last Saturday. The youngsters stopped at the Buffalo zoo. Each machine was provided with plenty of "goodies" and the children had an enjoyable time.

**Hartford Show A Success**—Hartford's Indian summer motor car show at Charter Oak Park proved a success and much business is said to have been done as a result of the exhibition. In all probability a similar exhibition will be held next summer or rather late in the fall.

**Youthful Driver**—At the recent county fair held at Sandwich, Ill., the country folk displayed great interest in the exhibition drive made by Homer Ohlhaver, aged 4, who handled a Reo roadster in a clever way. The boy's father, of course, was in the car, but the youngster showed he was able to handle the car, shift gears, steer and apply the brakes. The only thing that apparently stumped him was cranking the engine.

**Good Roads Rally**—Between 200 and 300 motor cars are expected to dump their passengers at Atlantic City, N. J., when the big good roads convention will be held in the casino of the Royal Palace hotel this week. Governor Fort, of New Jersey, will open proceedings with an address indorsing the good roads movement. The Freeholders from twenty-one counties have been invited to participate, and the majority of them have sent favorable responses. The soil-tilling representatives of the various granges of the Patrons of Husbandry will also be on hand in large numbers. The Freeholders and the grange representatives will travel to the rendezvous in the cars of several hundred motorists belonging to New Jersey and Pennsylvania clubs who will show their guests just where and how they propose to improve the roads. After the convention the farmers and Freeholders will be returned to their homes the same way. President Walter E. Edge, of the Atlantic City Automobile Club, which inaugurated the movement, says that the main topics to be debated at the convention will be the extension of the road system, the rebuilding of some of the neglected drives in the state, and a boom for the shore boulevard from Sandy Hook to Cape May. There will be a general exchange of views between the county officials, the farmers and the motorists as to the best methods of improving the relations existing between, with the ultimate object of bringing about an amelioration of the present somewhat harsh provisions of the Frelinghuysen law.

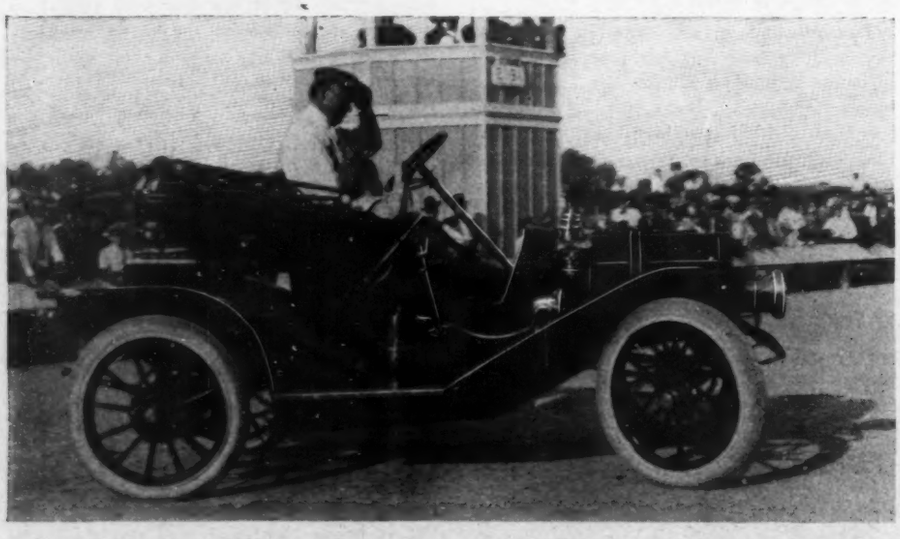
**Parade in Denver**—The closing daylight society event of the week devoted to the interstate fair and exposition at Denver was the decorated motor car parade on the afternoon of the 12th. Nearly 100 cars were in line. That the contest for honors was spirited was evidenced by the lavish outlay of money for decorations—some of them causing checks in three figures to be drawn. The parade passed through the streets of the city, and judgment was given and prizes awarded before the grand stand at the fair grounds, 4 miles from the courthouse. The prize winners were: George C. Turner, six-cylinder Franklin, decorated with La France roses, first; Miss Ruth Boettcher, Fritchle electric, decoration pink poppies; the machine was surmounted with arches and extended standards, on each of which poised a snow-white dove, second prize; J. C. McGill, Thomas Flyer, banked his tonneau with a regular stage setting of silver rocks, out of which grew red California poinsettas in profusion; surmounting the rear was a throne on which sat a "silver queen," Miss Florence Wheelock, holding the reins fastened to a flock of doves.

**Another Packard Record**—S. D. Waldon, sales manager of the Packard Motor Car Co., has succeeded in lowering his own Pittsburg-Philadelphia record to 14 hours 1 minute for the 303 miles. He was accompanied by W. N. Murray and W. W. Bennett, of Pittsburg, and F. C. Graves and L. R. Mack, of Boston, and only 12 minutes was lost by stops—2 minutes for a blocked railway crossing, 3 minutes stopping for coffee and 7 minutes for taking on gasoline.

**Strang Will Drive Renault**—Paul Lacroix, manager of the American branch of the Renault, announces he had engaged Lewis Strang to drive Renault cars in speed events for the coming year. Mr. Lacroix expects to receive at least one of the Renault racers built for the grand prix so he can enter the car in the Automobile Club of America race at Savannah on Thanksgiving day. Strang will drive the Renault entry in the 24-hour race to be run at the Brighton Beach track on October 2 and 3.

**Fairbanks Sees Parade**—Sixty-five cars passed in review before Vice-President Charles Warren Fairbanks on his recent visit to Marinette and Menominee, the twin cities of Wisconsin and upper Michigan, and they represented the cream of the motor world of the lumber towns. The parade was, in a way, historic, for besides the sixty-five cars, at least ten of ancient design, some as old as 15 years, puffed vigorously in the procession and repeated the second-last run of the one-hoss shay of literature. Chicago men who accompanied Vice-President Fairbanks were surprised at the number of machines owned in the two cities.

**Races at Stroudsburg**—A series of races and a gymkhana held at the fair grounds at Stroudsburg, Pa., last Saturday, under the auspices of the Monroe County Automobile Association, attracted several thousand enthusiastic spectators. J. H. Dye, of New York, drove his 45-horsepower Royal Tourist to victory in the mile race in 1:44⅕. B. F. Hayden, 22-horsepower Buick, annexed the special mile event in 2:03, and the obstacle race in :34⅘. The Dye-Royal Tourist combination made a runaway of the potato race in 1:25, while George Berryman drove Fred Wallace's Buick to a victory in the backward race in :16. A unique gymkhana feature, the bag-punching contest, also went to the Berryman-Buick team, whose performance throughout was so meritorious that it was also awarded a special silver cup.



HOMER OHLHAVER, AGED 4, DRIVES EXHIBITION IN REO AT SANDWICH, ILL.

# News from the Motor Clubs

**Rochester Club Moves**—The Rochester Automobile Club has moved into its new quarters in the New Hotel Seneca, on South Clinton street, which is one of the finest in the state and which will be an excellent location for the club whose membership is now 525. The rooms are located on the lobby floor and are very accessible. The Rochester club is warning its members against the following speed traps: On the Summerville boulevard near the toll house; on the Buffalo road between Coldwater and the barge canal; between Cayuga and Auburn and near Camillus.

**Goddard Again in Harness**—Asa Goddard is "on the job" again. When he resigned from the secretaryship of the Cleveland Automobile Club to go into the engineering business it was thought that he was finished with everything connected with the Cleveland club, but now he is in direct charge of the final work upon the new Euclid road constructed by the club. For a long time past Goddard has been chief engineer of the Wadsworth Stone Co., of Pittsburg, and his concern has been awarded the contract for finishing the road. So Goddard is really finishing the work which he began long ago, for it was he who first suggested the idea of such a highway, and he who first raised the necessary funds.

**Maryland Increases Dues**—At the first of the winter meetings of the Automobile Club of Maryland the annual membership dues were increased from $10 to $20. The dues of associate members will remain unchanged. The club hopes by this to do more efficient work for the good roads movement in the state and to wage a strong campaign for fair motor car laws, and to see that these laws are properly enforced. President James Stone Reese announced that the annual election of officers would be held Tuesday, October 13. Dr. R. M. Rowe was appointed chairman of a committee to arrange for the club's annual touring contest.

**Would Change Rules**—The Automobile Club of America has received a communication from the Marquis A. Ferrero Ventmiglia, president of the Automobile Club of Italy, embodying suggestions for a revision of the international rules at the coming meeting of the International Association of Recognized Automobile Clubs which will meet in Paris on October 11. The new suggestion limits the cylinder bore to 130 mm., the arguments in favor of this limitation being that, although there exist types on the market larger than 130 mm. bore, it would be better to limit the maximum to this measurement, because there is an opportunity to leave a sufficiently strong difference between the 155 mm. bore of cylinder of racing cars and of the 130 mm. bore proposed. It is also suggested that owing to continual improvements the power obtained from a 130 mm. bore motor is already sufficiently great for touring purposes. These suggestions have been forwarded to each American manufacturer and manufacturers' association with a request that their views be forwarded to the club's technical committee in order that the club's representatives may lay the American manufacturers' views before the international association.

**Would Sidetrack Climb**—There is a movement on foot to kill the forthcoming hill-climb of the Automobile Club of Hartford over the Avon mountain course on November 7 and substitute therefor a 24-hour race at Charter Oak trotting park. The chief cause of the present agitation may be said to have been caused by the success of the Brighton Beach 24-hour race. A. J. Welch, one of the owners of the park, is much in favor of the scheme and has given assurances that the park can be secured. The dates proposed are October 16 and 17.

**Cleveland's Unique Scheme**—The Cleveland Automobile Club plans to accomplish something absolutely unique in the history of motor contests next month at the time of the reliability contest, October 14, 15 and 16. The plan is simply this: Instead of hurrying all the contesting cars through the small towns along the way as though they were in a road race, it is the intention to hold all machines for 10 or 15 minutes, while prominent Clevelanders make addresses to the sure-to-be-assembled crowds. These little speeches will deal with the subject of good roads, and touch upon the relationship of the farmer to the motorist, and in short, will endeavor to create a better feeling between the two. These temporary stops will also give the ruralites a good chance to inspect the cars in the contest. The most prominent men in Cleveland have accepted places upon the committee, among them being Mayor Tom L. Johnson, Alexander Winton and F. B. Stearns.

**Blind Handicap Billed**—On Saturday, September 26, the Delaware State Automobile Association will hold a sealed-time run over a 70-mile course from Wilmington, Del., to Coatesville, Pa., going by way of the Brandywine creek and Downingtown and returning via Kennett Square. A secret time limit for covering each control will be selected and kept by one responsible person on the committee, and the car arriving at each checking station nearest the official time will be declared the winner. There will be three prizes.

**Milwaukee's Race Meet**—The second annual Milwaukee race meet will be held at the state fair park near Milwaukee Friday and Saturday under the direct auspices of the Milwaukee Automobile Club. Last year the Milwaukee Auto Trade Association conducted the affair. The program for the meet includes, besides a parade of cars over the city of Milwaukee on Friday, the following events: Two-mile open for gasoline stock cars listed under $1,000; 5-mile open for gasoline stock cars listed from $2,000 to $3,000; 10-mile open for gasoline stock classes listed at $4,000 or over; 10-mile open free-for-all for roadsters, any price; 5-mile open for gasoline stock cars selling from $3,000 up to $4,000; 10-mile open for gasoline stock cars selling from $1,251 up to $2,000; 24-hour endurance contest, open to stripped stock cars or stock chassis at $1,000 or over.

YOUNG OHLHAVER SHOWS HE CAN SHIFT GEARS

# Legal Lights and Side Lights

## CHAIN TIRE DECISION

A decision has been rendered by Supreme Court Justice Davis in the case of Edward Anderson, who was arrested on March 8 last charged with driving a car in Central park, New York city, with chains on the rear tires, in violation of a city ordinance and the motor vehicle law. Anderson was convicted, and the case came before the supreme court on a writ of habeas corpus. It was held that the motor vehicle law was unconstitutional. Justice Davis gives the opinion, and says the law is unconstitutional because it only forbids the use of chains on tires on roads within the jurisdiction of the department of parks. The court says there are other methods of preventing skidding, "equally as bad for roadbeds, but there is nothing in the evidence to warrant the conclusion that the chain is more injurious than the other methods. Some may use the park highways freely, while others may not unless they get the commissioner's permission. These latter are entitled to equal protection of laws, and their constitutional rights are invaded. The writ of habeas corpus is sustained and the relator discharged from custody."

## QUAKERS DISCUSS LAWS

The executive committee of the Pennsylvania Motor Federation held a special meeting at the home of the Automobile Club of Germantown to discuss plans for formulating a new state law for the government of motor cars and to transact other important business. After listening to the various committee chairmen's reports the meeting took up the time till lunch hour in discussing plans for increasing the federation's membership, President Robert P. Hooper's report having urged the absolute necessity of bringing into the organization every club and individual in the Keystone state interested in the sport of motoring. It was decided to form a committee whose duty it shall be to see to the formation of clubs in all localities where there are a sufficient number of "unattached" motor car owners to warrant such a step. Secretary Paul C. Wolff was appointed chairman of this recruiting committee. That the federation had not been lax in the work of recruiting, however, was indicated by the admission at this meeting of no fewer than eight clubs to the fold—Monroe County Automobile Association, Automobile Club of Lawrence County, Johnstown Automobile Club, Automobile Association of Scranton, Automobile Club of Franklin, York County Automobile Club, Pottstown Automobile Club and the Oil City Automobile Club. Having disposed of lunch, the meeting reconvened at 2 o'clock and for several hours listened to the reading of and discussed the provisions of a rough draft of a new state law governing the operation of motor cars, and also a new measure for the building and maintenance of roads. S. Boyer Davis, of the law committee of the Automobile Club of Philadelphia, drew up the proposed measures, and during and after the reading quite a number of valuable suggestions and alterations were proposed and incorporated into them. The entire matter was then turned over to the federation's committee on legislation, which was ordered to make the proposed new laws public, after being whipped into legal shape. The matter of speeding and its prevention was then taken up, and it was decided to use the best efforts of the federation in putting a stop to the practice. President Hooper was especially insistent on the absolute necessity of putting a curb on the hare-brained driver whose insane desire to "beat it" will surely imperil the rights of all that large majority of motorists who are content to use the roads in a rational manner. Almost every one of the score or more in attendance at the meeting had something to say on the subject, and it was nearly nightfall when a motion to adjourn was passed. Among those specially prominent at the meeting were President Robert P. Hooper, Philadelphia; Vice-President Peter A. Meixel, Wilkes-Barre; Secretary Paul A. Wolff, Pittsburg; State Senator Frederick A. Goodcharles, Milton; S. Boyer Davis, Philadelphia; L. P. Baekey, Philadelphia; Joseph H. Weeks, Delaware County A. A.; John A. Wilson, Franklin; Martin Kinports, Lancaster; Dr. J. F. Kleindinst, York; Dr. W. H. Stephens, Wilkes-Barre; Lyman H. Howe, Wilkes-Barre; Joseph Madison Porter, Easton; P. Donal Folwell, Quaker City Motor Club; John G. Kugler, Pottstown; John H. Rex, Norristown; John Burd, Delaware State A. A.; President Powell Evans, A. C. of Philadelphia; Joseph Bancroft, Wilmington.

## NEW LEGAL ANGLE

When Secretary Edwin S. Nyce, of the Norristown Automobile Club, of Norristown, Pa., and Sydney E. Ballard, a member of the same organization, appeared before Justice Thomas B. Wilson, at Eagleville, in the interest of Charles W. Bacon, a Philadelphia motorist, they were thunderstruck at being placed under arrest, charged with "boisterous and unseemly conduct on the highway." One week before, while engaged in the heinous practice of warning unsuspecting drivers of the existence of a trap nearby, Nyce and Ballard became engaged in a heated controversy with James H. Schrank, a Philadelphia Hawkshaw, in the course of which the former is said to have "told it to him" in such a vigorous manner that the residents of the near-by houses in quiet Eagleville rushed to their front doors to discover the cause of the commotion. The detective alleges that Nyce, who is a 135-pounder, threatened to "lick him" and called his employer, W. S. Dickerson, a "grafter." At the hearing the sarcastic remarks of Nyce and Ballard so exasperated the justice that he fined them $10 each, which was paid, with the comment from the culprits that "it was worth the money."

## AFTER QUAKER NEMESIS

As a direct result of the alleged high-handed manner in which Justice John Fish, of Fallsington, and his constables are enforcing the Pennsylvania state motor laws the Bucks County Automobile Club was formed in Langhorne, Pa., last Friday night. A mass meeting of Philadelphia, Trenton, Bristol and Bucks county motor car owners had been called to protest against Justice Fish's rigid interpretation of the laws, when it was decided that much better results could be obtained by forming a permanent organization. This was done and Dr. Harry Lovett, of Langhorne, was elected president and Ellwood Watson, secretary and treasurer. The meeting, which was largely attended, was held in the home of the Bucks County Country Club. The new club will seek incorporation at once and will then open fire in the county court at Doylestown on the doughty squire. G. Douglass Bartlett, of the legal committee of the Quaker City Motor Club, was at the meeting giving the members pointers on how to circumvent their nemesis.

## PRECEDENT ESTABLISHED

The first motoring case to be tried under a recent act of the general assembly of Maryland which permits motorists to appeal from what they consider unjust decisions of police magistrates was passed upon in the criminal court of Baltimore. It resulted in the acquittal of Elmer J. Whiteford, who had been fined $20 and costs for operating his motor car without a light and without the proper number tag on the rear of his car. It seems that while riding along Park Heights avenue on July 3, Mr. Whiteford lost the bowl of his rear lamp and was unable to light it. He did light his two front oil lamps and informed the police of what had happened. He was instructed by them to drive his car along at a careful rate, sounding his horn. This he did. A few days later he was surprised at being arrested on a warrant on the charge mentioned above. The fine followed.

# Brief Business Announcements

**Salamanca, N. Y.**—C. R. Gibson is preparing to erect a garage in this town.

**Nashville, Tenn.**—The Burk Auto Co., of Hamilton county, has been incorporated with a capital stock of $10,000.

**Augusta, Me.**—The Cavicchi-McDonald Motor Car Co., of Kittery, has been incorporated with a capital stock of $25,000.

**Philadelphia, Pa.**—B. Applegate & Co., of 326 North Broad street, have been appointed local agents for the Schacht runabout.

**Pittsburg, Pa.**—A permit has been granted to J. H. Hammett for the erection of a one-story garage at 415 Atlantic avenue.

**Detroit, Mich.**—The Cadillac Motor Car Co. has made preparations to move its local branch from 256 Jefferson avenue to 1403 Woodward avenue.

**Newark, N. J.**—The Packard Motor Car Co., of New York, has leased the Osborne Realty Co.'s store at Branford and Treat place for a term of years.

**Chester, Pa.**—The proprietors of the Racquet Club garage, of Philadelphia, have leased the Moyamensing building in this city, and have fitted it up as a garage.

**New York**—The Oldsmobile company has leased the building at 251-253 West Fifty-eighth street and will have it remodeled into a garage at a cost of $30,000.

**Milwaukee, Wis.**—The Gove Automobile Co., which is the state agent for the Regal, has moved into its new garage at 52-56 Biddle street. This company also has the agency for the Jackson and the Brush.

**New York City**—A motor coach service has been inaugurated between the Manhattan hotel and Briarcliff Lodge, in Westchester county. The service is to be continued throughout the fall, two cars a day being run each way.

**Cleveland, O.**—The Buick Motor Co., of Flint, Mich., has made arrangements to make its headquarters for northern Ohio in this city. Quarters have been leased in the Dodge building on Euclid avenue. The branch is to be under the management of J. Timendorfer.

**Salt Lake City, Utah**—E. H. Harriman is reported to be interested in the organization of a new company to be known as the McKeen Motor Car Co., which has been recently formed with a capital stock of $1,000,000. The new company is to manufacture a special type of car invented by W. R. McKeen, Jr., formerly superintendent of motive power on the Union Pacific. It was the original intention to operate these cars on a line between this city and Omaha, but the interstate commerce commission refused the Union Pacific permission to establish such a line in this state.

**Newark, N. J.**—The Ellis Motor Car Co. has moved into its new building at 124-26 Washington street.

**Houston, Tex.**—The Corsicana Motor Co., of Corsicana, has been incorporated with a capital stock of $6,000.

**Trenton, N. J.**—The Auto Accessories Co., of Camden, has been incorporated with a capital stock of $10,000.

**Placerville, Cal.**—Sherman & Fairbanks, who have been operating the motor bus line to Lake Tahoe, have dissolved partnership, and in the future the business will be run by Mr. Sherman.

**South Bend, Ind.**—Lloyd F. Weaver, who for a number of years has been acting as sales manager for the Studebaker Brothers Mfg. Co., is going to Portland, Ore., where he will take charge of the Studebaker business.

**Philadelphia, Pa.** — Application will shortly be made for a charter for a company to be known as the Berrodin Rubber Co., which is to engage in the manufacture of and sale of motor car tires, rubber goods, accessories, etc.

**Providence, R. I.**—The Tufts-Justin Co., which, as has been announced, was recently appointed local agent for the Stevens-Duryea to succeed the Snow Automobile Co., is to remove into new quarters in the Dutee Wilcox building, at Aborn and Washington streets, as soon as the necessary alterations are completed.

**Brooklyn, N. Y.**—Grand Avenue Garage, capital stock $10,000, to deal in motor vehicles, etc.

**Philadelphia, Pa.**—Penn Motor Co., capital stock $100,000, to manufacture and deal in motor cars.

**Albany, N. Y.**—Apthorp Motor Car Co., capital stock $50,000, to manufacture horseless vehicles, motors and engines.

**Brooklyn, N. Y.**—De Shaw Motor Co., capital stock $10,000, to engage in the manufacture of machinery, motor boats, etc.

**Brooklyn, N. Y.**—Chester Auto and Tire Filling Co., capital stock $50,000, to manufacture compounds for filling rubber tires.

**Dover, Del.**—W. D. Spring Cushion Tire Co., of Philadelphia, capital stock $250,000, to manufacture tires for all kinds of vehicles.

**Camden, N. J.**—James Leckie & Son Co., capital stock $250,000, to manufacture gas and gasoline engines, motor cars, bakers' machinery, etc.

**Louisville, Ky.**—Louisville Taxicab Co., capital stock $5,000, to run a taxicab service. John Roche, W. E. Coldeway and L. K. Delph are the principal movers in the new enterprise.

**Buffalo, N. Y.**—Densmore Co., capital stock $15,000, to deal in motor cars. The incorporators, W. R. Densmore, of this city, and Fred Densmore and Frank A. Sturtevant, of Erie, Pa.

**Indianapolis, Ind.**—The Motor Car Sales Co., of this city, has been incorporated with a capital stock of $25,000.

**Indianapolis, Ind.**—The Southern Indiana Automobile Co., of Seymour, has been incorporated with a capital stock of $20,000.

**San Antonio, Tex.**—Raymond Copley, of Corpus Christi, is planning to start a motor bus line between this city and Big Springs.

**Honesdale, Pa.**—Edward G. Jenkins has bought the Canivan machine shop at Industrial Point, and will have it remodelled into a garage.

**Boston, Mass.**—The Taylor-Palmer Co.'s garage was burned Sunday morning with a loss of more than $150,000. The garage was located at 169-171 Huntington avenue.

**Los Angeles, Cal.**—Plans are being prepared by A. L. Haley for a garage to be built for Thomas Higgins on Olive street, near Eighth. A feature is to be made of the machine shop.

**Chicago, Ill.**—Curtis Betts, who has been connected with the Mitchell company, has severed his connection with that concern and in the future will be on the staff of the Peerless company.

**Albany, N. Y.**—The Precision Tool and Instrument Co., of Manhattan, has been incorporated with a capital stock of $100,000, and will engage in the manufacture of motors, engines, machinery, tools, etc., in New York.

**Beatrice, Tex.**—The quarters at 403 Ella street, formerly occupied by the Beatrice Electric Co., is being overhauled, and as soon as alterations have been completed, it will be used as a garage by William Steffen.

**Los Angeles, Cal.**—Manager Rose has announced that work has been commenced on the new Elmore garage, which is to be erected at 742 South Olive street. There is to be a salesroom, garage, repair shop and offices.

**Newark, N. J.**—Benjamin F. Adams, who has been acting as manager for the Carl Page company, agent for the Peerlees, has resigned from that company and in the future is to be connected with the Ellis Motor Car Co. Adams has also been representative for the White company.

**Philadelphia, Pa.**—W. C. Longstreet, who has been associated with W. P. David, has purchased the interest of the latter in the business, and in the future will act as the sole representative of the Maxwell in this city. Mr. Longstreet is planning to remove to larger quarters in this city in the very near future.

ANNUAL MEETING OF THE FORD MANAGERS AT DETROIT

Top row, from left to right—John Dodge, John Anderson, Ed Dodge, Frank Kulick, D. Gray; second row—L. A. Holmes, James C. Couzens, F. M. McGregor, F. R. Fox, Stanley Roberts, N. A. Hawkins, Henry Ford; third row—R. M. Lockwood, M. D. Coate, H. B. White, W. C. Anderson, Charles Hendy, H. B. Harper; fourth row—R. P. Rice, Thomas J. Hay, Roger Stearns, Harry Cunningham; bottom row—L. C. Block, Gaston Plantiff, C. E. Fay, C. C. Meade.

**Rubay in Body Business**—Leon Rubay has taken charge of the wholesale department of the motor car body building branch of Rothschild & Co., New York city. The plant will be enlarged and bodies will be built in large quantities.

**Darracq's Answer**—Investigation has been made by G. M. McWilliams, of the story relating to court proceedings brought by some stockholders against A. Darracq & Co., Suresnes, France, asking a dissolution of that company. Upon making inquiries of the Darracq company regarding the matter, Mr. McWilliams has been officially advised by the chairman of the board of directors as follows: "The articles to which you refer relate to some proceedings taken by a few shareholders in France at the instigation of the Marquis de Dion to have it declared that A. Darracq & Co. is irregularly constituted under French law. The judgment of the court was given on August 5, when the proceedings were dismissed and the claimants condemned to pay the expenses in addition to 5,000 francs damages for bringing an action without reasonable motive, the Marquis de Dion being personally condemned in 1,000 francs damages. The court intimated that a higher fine would have been given, but it thought the injury to the company had been more moral than actual."

**Sets Allotment Dates**—Chairman H. O. Smith, of the American Motor Car Manufacturers' Association's show committee, announces the following dates for drawing and allotment of space for the show which opens New Year's eve in the Grand Central palace, New York: A. M. C. M. A. members draw Thursday, October 8, at 10 a. m.; allotment of space to motor car builders not members of the A. M. C. M. A. Thursday, October 8, at 2:30 p. m.; allotment for accessory makers not members of the Motor and Accessory Manufacturers' Association, Thursday, October 8, at 5 p. m. A meeting of the committee of management of the A. M. C. M. A. will be held Tuesday, October 6, at 10 a. m. The A. M. C. M. A. show committee will meet Tuesday and Thursday, October 6 and 8, at 10 a. m. All applications for the Grand Central palace show must be made at the headquarters of the A. M. C. M. A., 29 West Forty-second street, New York, by October 1. All applications received up to this date will be treated alike, while applications received after that date will be given consideration by the show committee, following the drawing and allotment of prior applications.

**Palace Decorations**—After several weeks of deliberation over four designs from leading decorators, the Grand Central Palace show committee has about settled upon the S. R. Ball plan as the best although the costliest. While the full specifications of the affair are not given out, it may be stated that the scheme is of the early English period, having pillars and balconies, the construction being stucco and beam work. The main galleries will be white with sap green relieved by gilt signs. The ceiling of the main auditorium will be covered with a fabric of Italian sky blue, while at the end of the auditorium will be placed mirrors, and a garden with natural plants and statuary. The paintings to run entirely around the balconies will be created from scenes in recent motor car contests. Probably the greatest change will be the outside of the building, the porte cochere being treated with handsome cast figures, balustrades, electric signs and a large and handsome decorative painting, the whole brilliantly illuminated by searchlights that will advertise the presence of the show when spectators get within three or four blocks of the big Lexington avenue building. The specifications call for ten statues throughout the building, each 6 by 8 feet high, while more than 10,000 electric lights will be used in the new chandeliers and other decorative lighting. The final details will be settled upon at the meeting of the A. M. C. M. A. show committee to be held on October 6.

**Pope Makes Rim Statement**—Albert L. Pope, chairman of the tire committee of the Association of Licensed Automobile Manufacturers, has the following to say regarding the question of a standard quick detachable rim: "It is quite true that the mechanical branch of the licensed association has given much time and thought for a year and more to the question of a uniform design that could be universally used by those desiring quick detachable rims. In fact, by the beginning of August last it had selected from types which came to its attention a form which at the time seemed to it to suit all requirements. In order to bring about a definite adoption by the vehicle makers as represented by the several associations, if possible, of one type, the engineers expressed their approval of a form which was then before them. Such approval was a necessary step in the process of standardization, and though an important step was obviously entirely subject to the final adoption contingent upon other than mechanical ques-

tions. It is hardly to be expected that the licensed association as a body, with the far-reaching influence that its actions necessarily have, would take precipitate action. It has not as yet taken any action specifically adopting any particular type of quick detachable rim. Interested parties may rest assured that the matter is receiving most thorough consideration and careful study, and that whatever the final action may be, the rim adopted will be the type most suitable from every standpoint that can be properly considered.''

**Quinby Selling Pennsylvanias**—The Pennsylvania Auto Motor Car Co. has just concluded arrangements with J. M. Quinby & Co., carriage builders of Newark, N. J., to distribute Pennsylvania cars in northern New Jersey, New York city and vicinity. Quinby & Co. will open a show room in New York city and will have as a running mate to the Pennsylvania the Isotta. The initial order for Pennsylvania cars calls for 150 machines.

**Will Sell Matheson Output**—A new company, the Matheson Automobile Co, which is independent from the Matheson Motor Car Co., was organized September 12 to take over the entire selling end of the manufacturing company and permit the latter to devote its energies exclusively to the manufacture of motor cars, all of which will be taken by the selling company. Arrangements have been made for desirable salesrooms on Broadway from which point the company will market its cars in Greater New York and distribute throughout the country. C. W. Matheson, president of the manufacturing company, who at present is residing in Wilkes-Barre, Pa., will remove to New York and there devote his time exclusively to the marketing of the product of Matheson cars. The entire capital stock of $150,000 of the selling company has been subscribed, principally by bankers and business men of Wilkes-Barre, and, as the manufacturing company simultaneously arranged for a bond issue of $200,000, there will be $350,000 additional capital at the command of the producers of the Matheson car. Plans are under way to more than double the output of the Matheson plant for 1909 and a shaft-driven model will be produced in addition to the present chain-drive. The Matheson company has engaged the services of L. C. Kenen as mechanical engineer and designer, whose practical training was received in the plants of the Renault,

PORT COCHERE PLAN OF GRAND CENTRAL PALACE SHOW

Darracq, Clement-Bayard and Richard-Brasier companies. The Matheson will be entered in the Vanderbilt and will be driven by a French expert who has not yet been named.

**Ford Branch Managers' Meeting**—The branch managers' convention of the Ford company was held in Detroit last week, those attending being: H. B. White, Paris; B. M. Thornton, London; R. M. Lockwood, New York city, foreign department; F. R. Fox, Toronto; G. M. McGregor, Walkerville; C. E. Fay, Boston; Gaston Plaintiff, New York city; L. C. Block, Philadelphia; E. R. Stearns, Buffalo; M. D. Coate, Cleveland; H. Cunningham, Detroit; T. Hay, Chicago; W. C. Anderson, St. Louis; Charles Hendy, Denver; C. C. Meade, Kansas City; R. P. Rice, Seattle. The reports show 1908 to have been unusually prosperous, the total business coming exceedingly close to that of a year ago, so close as to be hardly appreciable, while 3,000 more cars could have been sold if delivery could have been secured, it is said. On Tuesday evening the office contingent bowled the branch managers, winning by a narrow margin. Wednesday was occupied with a tour of inspection of the old factory and the new million-dollar plant being erected at Highland Park, where 500 cars a day can be manufactured. Wednesday noon lunch was served in a tent on the ground to the managers and factory managers and foremen, and the new model T touring car assembled and explained to all attending. Fifteen thousand of these cars were allotted at this meeting. Thursday saw the wind-up with a luncheon at the Detroit Boat Club, trip around Lake St. Clair in John Dodge's steam yacht Hornet, and a banquet at the Country Club. In honor of the new car this spread was termed a ''model tea,'' and the table was one large T, the program printed in the colors of the car and die cut to the shape of the same. The various branch managers then shook the dust of Detroit off their feet and hastened to their respective homes.

CONFERENCE OF THE REPRESENTATIVES OF THE HARTFORD RUBBER WORKS CO. AT HARTFORD

Standing, left to right—D. W. Shattuck, G. D. Niles, G. R. Noble, F. J. Kerner, H. E. Field, vice-president; Charles Kenyon, A. D. Cruden, J. J. Tompkins, Charles Clark, D. W. Pinney, E. H. Fahy, F. B. MacClunie; top row, sitting, left to right—Charles Langmaid, George Orr, W. T. Powell, W. H. Reed, W. R. Barnes, H. C. Severance, H. F. Snyder, E. S. Roe; second row, sitting, left to right—H. Barth, Jr., E. W. Culver, E. H. Johansen, J. P. Krogh, A. L. Lowe, W. H. Bell, P. H. Goodall; lower row, sitting, left to right—H. B. McIntosh, W. Brown, M. C. Stokes, H. E. Smith, R. H. Gillies, J. D. Anderson, president; H. Plow, treasurer; F. Kesser, A. W. Kirk.

# Development Briefs

### MAKING LENS MIRRORS

Messrs. Stevens & Co., Inc., Providence, R. I., makers of mirror reflectors for lamps, have concentrated efforts on the process of silvering the mirrors and the employment of suitable backing on which this silvering process takes place in order to avoid cracking and blistering, which are caused by the unequal expansion of the glass and backing materials, this resulting in a disturbance of the contact between the silver and the glass. The company has a combination of backing materials, which it is claimed, when applied to the curved surface of the lens mirrored, have an equal co-efficient of expansion so that corrosive moisture and gases are prohibited from getting at the silver.

### WARNER AIR VALVE

The Warner Instrument Co., Beloit, Wis., is marketing an automatic air valve for the filling of pneumatic tires, and by the employment of which it is claimed a 4-inch tire can be filled in 15 seconds. The instrument is applied by pressing it against the valve, thereby opening the valve outlet and at the same time closing another one, which is nearer the end of the tube, thereby preventing any leakage when not in use. By releasing the pressure, in holding it against the tire valve, permits the air pressure to close it and the greater the pressure the tighter the valve will hold.

### SWINEHART MOTOR BUGGY TIRE

The Swinehart Clincher Tire and Rubber Co., Akron, O., has brought out a special motor buggy tire designed to have increased traction in mud and sand over the ordinary carriage tire. This tire is of the regular clincher design, permitting the use of clincher rims and allows the tire to wear down to the rim before coming off. It is made in sizes larger than the regular carriage tire, and increased resiliency is claimed because of the use of specially compounded and cured rubbers. The grooved side design allows of a wide tread, used to increase the traction in mud and sand.

### ELECTRIC LIGHTS FOR CARS

The Willard Storage Battery Co., Cleveland, O., has completed a series of tests of Tungsten lamps, to determine their ability to withstand conditions as encountered on motor cars. A lamp of this nature consumes, it is stated, less than half the energy of the usual carbon filament lamp, the electrical energy consumed being 1¼ watt per candlepower as compared with 3 to 3½ watts per candlepower needed in the carbon filament lamp. The Tungsten lamp design receives its current from the E. L. B. type of battery, which is a modification of the battery used for the Pullman car work. Two features of it are noticeable: By providing an expansion chamber in each cell cover an overflow of the solution is prevented, and the terminals are protected from corrosion by a thick bank of hard rubber vulcanized around them. The batteries are put up in oblong trays with end handles, convenient for car work.

### A BALANCED TIRE

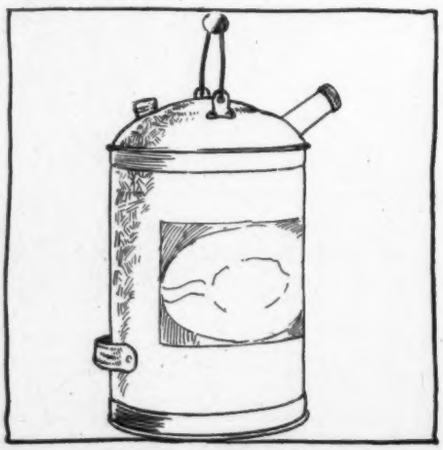
The Diamond Rubber Co., Akron, O., describes a well-balanced tire as one in which wear is so distributed that mileage possibilities of each principal part of the tire approach that point where they balance one another. This aim the company has worked for in its new tread, which is designed to resist abrasion so that the tire should not require retreading until the other parts of it are past that point where additional service could be expected because of age.

### B. & S. PIPE WRENCH

The Billings & Spencer Co., Hartford, Conn., has a new product in an improved adjustable S pipe wrench, which, while following the general lines of the company's S wrench, has a serrated jaw for use on the pipe. All parts of the wrench are steel forgings, the jaws are hardened, and the sliding jaw is fitted in a double groove. A patented thumb screw, on the adjusting knurl, locks the jaw at any desired angle. The wrench is made in three sizes, 6, 8 and 10 inches.

### DOVER GASOLINE CAN

The Dover Stamping and Mfg. Co., Cambridge, Mass., has brought out a new 5-gallon gasoline can, the main feature of which is the ease with which its contents can be poured into a gasoline tank without spilling. This is accompanied by the use of a spout made particularly large and of good length. There is a screw cap for the top of this to prevent evaporation. A special filling orifice is provided.



DOVER GASOLINE CAN

### THE MURREY WHEEL

The Murrey vehicle wheel, manufactured by J. T. Murrey, Cleveland, O., is one of the numerous resilient wheel types, designed to do away with pneumatic tires. The wheel consists of two rows of radially-disposed plungers, the enlarged heads of which form the periphery or tire part of the wheel. Each plunger, equal in length to the wheel spoke and taking the place of a spoke, has two coil springs of equal strength, one of larger diameter surrounds the outer half of the plunger, and the smaller diameter one the inner half. The inner spring has two movable bushings, and is normally compressed in opposite direction with the outer spring, the pressure being on both springs when the plunger comes in contact with the ground. The inner spring compresses first, after which the work is taken up by the others, which, in ordinary travel, never reaches complete compression. Both springs on all of the plungers are under compression at all times. The outer ends of the plungers which contact with the ground are slightly rounded.

### CAR-BO-NIT CLEANS CYLINDERS

The R. W. Willits Auto Accessory Mfg. Co., Alexis, Ill., manufactures Car-bo-nit, a liquid used for removing the carbon from the interior of cylinders and off spark plugs. Car-bo-nit, which has been on the market since June of the present season, is marketed in pint bottles and contains in its make-up eight hydrocarbons, kerosene and gasoline, however, not entering in its composition. In using it three tablespoonfuls are put in each cylinder through the spark plug opening and allowed to remain over night. The following morning the motor is started and run rapidly for a couple of minutes, which is done to force the carbon out through the exhaust valves. In cleaning plugs, the plug is placed on end with the open end up, filled with car-bo-nit and allowed to stand for a couple of minutes or longer, after which it is clean.

### CARBON REMOVER

The Automobile Accessory Mfg. Co., Baltimore, Md., has perfected a device for removing carbon from the cylinders of an engine, which is done by a mechanical arrangement and not by the conventional process of softening the carbon by liquids of one nature or another. The maker claims the device has been tried out and that it will remove carbon and prevent its accumulation. In one test a four-cylinder motor after a 2,000-mile run, without removing the spark plug, was examined and it was claimed there was not enough carbon in the cylinders to blacken the fingers of the person examining it.